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THE VETERINARY JOURNAL

A Monthly Review of Veterinary Science.

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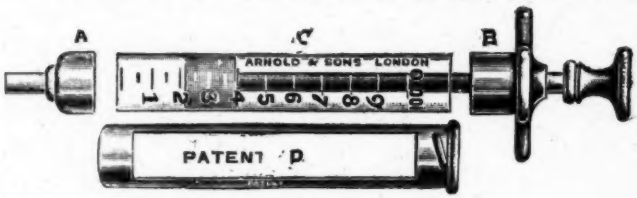

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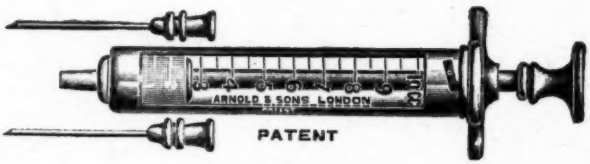

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THE

VETERINARY JOURNAL

JULY, 1910.

THE PRESIDENT OF THE ROYAL COLLEGE OF VETERINARY SURGEONS.

Mr. W. Freeman Barrett, M.R.C.V.S., Barrister-at-Law.

William Freeman Barrett was born at Wisbech, Cambridgeshire, and was educated locally. When the time was ripe for him to choose a profession, he determined to become a veterinary surgeon, and consequently proceeded to the Royal Veterinary College, Camden Town, to prosecute his studies. He passed his final examination and was admitted a member of the Royal College in July, 1881. Mr. Barrett's studious nature was not satisfied with this, and he determined to explore fresh fields, and in 1885 he matriculated at the University of London in the first division. He then devoted his attention to the study of law, whilst also practising as a veterinary surgeon in the South of London, and in 1893 he was called to the Bar, Middle Temple, and disposing of his practice, joined the South-Eastern Circuit.

In 1895 Mr. Barrett put up for the Council of the Royal College of of Veterinary Surgeons, and was elected, and has remained a member of that body ever since, being re-elected in 1899, 1903, and 1907. During these fifteen years Mr. Barrett has done incalculable service, both in General Council and in Committee, and was elected Vice-President in 1902, his knowledge of legal matters being particularly serviceable. His election to the Presidential Chair is a fitting climax. His work in connection with the Victoria Veterinary Benevolent Society as Treasurer is very well known to members of the profession.

Mr. Barrett has not limited himself to his professional work. He is a member of the London County Council for Deptford as a Municipal Reformer. He is now Vice-Chairman of the Public Health Committee, and Chairman of the Midwives Act Committee of the L.C.C.

With regard to professional politics, Mr. Barrett has always made for advancement, and although for some time doubtful about the proposed new Bill, he has given a pledge to do his best to get it passed into law. We hope he will be successful in his endeavours, in which case his year of office will form one of the most momentous in the history of the veterinary profession.

Editorials.

THE NATIONAL VETERINARY ASSOCIATION.

BEFORE another number of the VETERINARY JOURNAL will be issued the meeting of the National Veterinary Association for 1910 will be a thing of the past. We expect this year's meeting, which is to be held in London during the last week of July, will be one of the most successful ever held under the auspices of the Association. No doubt all our readers are aware that Professor Macqueen is the President for the year, and all who know him will fully realize that it will be no fault of his if the success does not even exceed expectations. The subjects selected for discussion are of the greatest importance, and the papers are being prepared by experts in their particular line. "Shivering and Stringhalt" are to be dealt with by Professor J. R. M'Call, and the discussion opened by Professor Wooldridge. "Contagious Granular Vaginitis in Cattle" is a disease about which far too little is known in this country, and yet it is very rife, and is probably one of the most important causes of sterility. This subject will be introduced for discussion by Mr. Ainsworth Wilson, and continued by Mr. Stockman. "Rickets in the Dog" is to be considered in a paper by Mr. F. W. Cousens, who is probably better known by his association with Mr. A. J. Sewell. The discussion will be opened by Mr. H. Gray. The remaining paper is to be on "Strangles," concerning which a lot of work has been carried out lately relative to its prevention. We expect to hear some valuable information on this subject. The paper is to be read by Captain Todd, of the Army Veterinary Corps, and Sir John McFadyean will open the discussion. Thus it will be seen that every taste is to be catered for, and there is promise of much profitable discussion.

This will be the first meeting of the National since the question of reconstitution has been so widely discussed. We have not observed this matter mentioned in the published notices of the meeting, but we think it more than probable that it will be introduced, and no doubt there will be an animated exchange of views. It can hardly be expected that the meeting will give any decision on a question of such importance to its existence at its

first time of discussion, even though many of the members may have discussed it at meetings of various local societies, but we trust there will be an opportunity given for a full explanation of the scheme by the promoters. And when considering the suggestion of amalgamation it would be well to remember our College motto, *Vis unita fortior.*

But the meeting of the National Veterinary Association does not limit itself to serious matters. The social element occupies a not unimportant part of the programme. The annual banquet will be held at the Hotel Cecil on the first evening (27th inst.), while for the second evening and the whole of the third day a programme of amusement is being mapped out by the Central Veterinary Society and the practitioners of the London district. These bodies have set themselves a very high standard on previous occasions, and we are informed that they are making efforts to even surpass it on this occasion.

We understand that a number of seats at the Coliseum are being reserved for the members of the National Veterinary Association at the performance on the evening of the 27th inst., and on the third day the members and their ladies will all be taken to the Anglo-Japanese Exhibition at the White City, where they will be entertained to luncheon at mid-day and to tea later. In this way the enjoyment of the day will be much less dependent on the weather than would be the case in the event of a garden-party or river trip.

For the convenience of members also arrangements are being made for the meetings to be held at the Hotel Cecil, where every desirable accommodation is to be obtained at one centre, and reduced terms are to be given to members staying in the hotel. The unofficial social side of the National meetings has always been very attractive, but in a big city like London there is a danger of this feature being lost unless precautions are taken to preserve it, since members would be likely to put up at widely separated hotels. It is to be hoped that the arrangements being made will prevent this happening, and we hope to find the usual large happy family at the Cecil during the National week. There will be plenty of sleeping and other accommodation at the hotel at that time, since it happens not to be at the height of their season.

Consequently we hope the members will turn up in full force and bring their wives with them, and so make the 1910 meeting the success it deserves to be, both intellectually and socially.

THE SO-CALLED SOUTH AUSTRALIAN "DRY-BIBLE."

In our issue of March of this year we reprinted an official report by the Government Bacteriologist of South Australia on the above subject. It was an interim report, and further particulars were promised, but are not yet to hand. However, our attention has been drawn by a letter appearing on p. 434 to some very serious misstatements in that report, and we hasten to correct the erroneous impressions that may (or rather must) have arisen in the minds of our readers as a result of those misstatements, which refer especially to the number of animals affected. The numbers quoted were certainly alarming, but they appeared to be official. We are very glad indeed to be able to contradict those numbers on the authority of the minister at the head of the Live Stock Department. When compared with the figures furnished by that Department it will be seen that the deaths from this disease, paralysis (the term "dry-bible" is much to be deplored), were only about one-tenth of those quoted for 1908 by Veterinary Surgeon Desmond (2,395 to 232). When, however, we look at the figures for 1907 we are simply astounded at the disparity—viz., 47,480 to 538!!! No wonder we have received letters of complaint that such figures should have been published. We regret it, but the fault is not ours. On referring to a corrected report which we have received (ordered by the House of Assembly to be printed December 8, 1907), we find the figures 47,480 altered to 3,067, still about six times the number of deaths reported by the Live Stock Department. Since observing these variations and corrections we have looked up the *Journal of Agriculture of South Australia* for the original paragraph quoted by Veterinary Surgeon Desmond, and there we find a most extraordinary juggling of figures. Although in the text 47,480 deaths are said to have occurred from "dry-bible" (a cattle disease) in 1907, yet the table following shows that same number to be the deaths of sheep ascribed to "dogs and foxes." What can we think of such unaccountable confusion of figures? And what can we think

of an investigator adopting and quoting such figures when they are so palpably and absurdly wrong?

We had not intended criticizing the original "interim" report pending the publication of details, but in the face of the above glaring inaccuracies we feel that we are compelled to do so.

Mr. Desmond's report may be divided into four sections: (1) A history of the official inquiries into the prevalence, &c., of the disease; (2) an account of the symptoms; (3) a very brief summary of his own experiments; and (4) statistics regarding the extent of loss occasioned by so-called "dry-bible."

It will be seen that (4) is flatly contradicted on the authority of the Ministerial head of the Department, and we have already dealt with it. The symptoms and *post-mortem* appearances are considered in such an indefinite manner that even a satisfactory comprehension of the disease or diseases is difficult, if not impossible.

It is, however, Mr. Desmond's account of his experiments that leaves one in a state of bewilderment. "Organisms" are isolated which are numbered 1, 2, and 3, but their nature, morphological and cultural, is never even indicated. A culture of No. 3 is appalling in its effects—*e.g.*, "a few *moments* after injection into a healthy cow there is a shivering fit, and the animal falls to the ground, &c. . . . This lasts only a few moments, and the animal then rises to its feet, 'to present' the following symptoms: Pulse, respiration, and temperature much *accelerated*, &c. . . . Death may take place in from *nine to ten hours*." "Several sheep have been killed with this micro-organism, death taking place in about four hours."

Having after such manner rapidly reviewed his experiments, of which not a detail is given, even such details as the dose and the region of inoculation, Mr. Desmond devotes almost the same space to explaining the "postulates" of Koch, and adds that "all the conditions have been repeated many times in the case of the micro-organisms isolated in the prosecution of this inquiry."

Further quotations from the report are unnecessary. It is more than regrettable that work which of itself may or may not have been good should have been presented to the public in such a guise.

Indexed B. A. I.

General Articles.

THE RELATION OF THE TUBERCULOUS COW TO PUBLIC HEALTH.[1]

By E. C. SCHROEDER, M.D.V.

Superintendent of Experiment Station, Bureau of Animal Industry, United States Department of Agriculture.

Introduction.

The International Congress on Tuberculosis at Washington in September, 1908, expressed the important conclusion, almost without a dissenting voice, that bovine tuberculosis, or tuberculosis among dairy cows, is a menace to public health of altogether too great importance to be ignored.

One result of Dr. Robert Koch's address at London in 1901, in which he announced his view that human and bovine tuberculosis are not identical diseases, and that bovine tuberculosis is a negligible factor for the health of mankind, is the new life that was infused into investigations concerning all phases of the tuberculosis question. Everywhere investigators endeavoured to prove or disprove Koch's announcement, and hence the conclusion of the International Congress in 1908 has behind it the enormous mass of evidence collected during seven long years by diligent, scrupulous, impartial, and intelligent seekers for truth. It is not a hastily drawn conclusion or a conclusion based on inadequate evidence, neither is it the conclusion of a single man or of a few co-workers, but it is the nearly unanimous conclusion of those who are best qualified to weigh the evidence and to judge what it signifies, and hence it is the conclusion on the relationship of bovine tuberculosis to public health which, for the time being, we cannot reasonably refuse to accept.

Though Koch reiterated his former view at the Congress referred to, most of his arguments have fallen. For example, it has been shown that tuberculous lesions in persons, especially children, are frequently due to tubercle bacilli of the bovine type; that tubercle bacilli isolated from human tuberculous lesions may be more virulent for cattle than the bacilli commonly isolated from bovine tuberculous lesions; that tuberculosis of the organs of digestion and associated structures is much commoner than it was formerly believed to be; that the localization of tuberculous lesions in the lungs does not prove

[1] Issued by the Bureau of Animal Industry, United States, America.

that the infection was inspired with the air; that the seat of tuberculosis in the body gives no clear idea of the portal through which the infecting organisms gained entrance; that tubercle bacilli may pass through the intestinal mucosa without affecting it and cause tuberculous processes in remote portions of the body, the lung and elsewhere; that the tuberculous processes in the lung, commonly originate from the finer blood capillaries and not from the finer ramifications of the air channels, and consequently are attributable to tubercle bacilli that reached the lung with the blood stream; that the type of the tubercle bacilli, human or bovine, is not constant, and that the two types of bacilli, human and bovine, are connected by transition forms, so that one type merges gradually into the other.

As tuberculosis is alike the commonest disease of persons and cattle, and as persons and cattle are the commonest victims of tuberculosis, it is important for the protection of public health to know how tubercle bacilli are scattered from the bodies of tuberculous cattle and how they are introduced into the bodies of persons.

Facts shown by Experiments.

At the Experiment Station of the United States Bureau of Animal Industry the following facts were demonstrated:—

(1) The commonest way in which tubercle bacilli leave the bodies of tuberculous cattle is per rectum with the fæces. Tuberculous cattle also expel tubercle bacilli from their mouths and nostrils, directly with their milk, and rarely with their urine. The tubercle bacilli expelled per rectum have their origin in most instances in the lung and throat, from which regions they are coughed up, swallowed, and passed through and out of the digestive canal without loss of pathogenic virulence.

(2) The cattle that pass tubercle bacilli per rectum are not always visibly diseased; about 40 per cent. of apparently healthy but tuberculous cattle, which are not known to be tuberculous until they are tested with tuberculin, intermittently pass tubercle bacilli from their bodies per rectum with the fæces. This work of the Experiment Station has been confirmed by the work of the British Royal Commission on Human and Animal Tuberculosis. (See "Third Interim Report," London, 1909. A comparison of this report with *Bulletin* 99, May 11, 1907, and Circular 118, December 21, 1907, of the Bureau of Animal Industry, United States Department of Agriculture, is interesting.)

(3) The commonest impurity in market milk is cattle fæces. The

amount of fæces in market milk varies from a microscopic trace to a sediment clearly visible to the naked eye. Some samples of milk that show no sediment produce cream discolored precisely like the cream from milk heavily contamineted with fæces; such milk must be regarded as exceptionally dangerous and dirty, but unusually well strained.

(4) The union between cattle fæces and the tubercle bacilli they may contain is not firm. The bacilli are evenly and loosely distributed throughout the entire mass of fæces, from which, when they enter milk, they become datached and float free. Guinea-pigs inoculated with normal, fresh milk from healthy cows to which small amounts of fæces from tuberculous cows were added contracted tuberculosis as readily when the milk was used in a strained as in an unstrained condition; hence tubercle bacilli introduced into milk with the fæces of tuberculous cows cannot be removed by straining.

(5) When milk is allowed to stand for cream to rise, or when cream is separated from it rapidly in a centrifuge, the tubercle bacilli it may contain rise as abundantly with the cream globules as they gravitate with the sediment. This holds true when pure cultures of tubercle bacilli are added to milk, when the tubercle bacilli are added in the form of infected fæces, when they are added in the form of pus from a tuberculous abscess, and when they are present because of a tuberculous condition of the udder. Hence cream from tuberculous milk, volume for volume, contains more tubercle bacilli than the milk. It must be clearly evident from this that no system of purifying milk from bacteria that depends upon gravity or centrifugal force is reliable.

(6) Butter made from cream obtained from infected milk contains tubercle bacilli. This was proven by making butter from the milk of a cow affected with udder tuberculosis and by making it from the milk of a healthy cow to which small masses of fæces from tuberculous cows had been added. The butter on inoculation into guinea-pigs caused typical, generalized, fatal tuberculosis.

(7) The bland, opaque character of butter, either salted or unsalted, forms an ideal environment for the preservation of the life and virulence of tubercle bacilli. Tubercle bacilli were found to show no appreciable attenuation in ordinary salted butter in forty-nine days, to be still highly virulent after ninety-nine days, not to have lost their pathogenic virulence after one hundred and thirty-three days, and to be capable of

causing generalized fatal tuberculosis in guinea-pigs after one hundred and sixty days.

As the investigation of the Experiment Station of the Bureau of Animal Industry to prove the long-retained virulence of tubercle bacilli in butter called out a public criticism to the effect that it was not fair to draw practical conclusions about the persistence of this virulence from the inoculation of guinea-pigs, the following experiment, which may be more convincing, was made: Four healthy hogs, proven to be free from tuberculosis by the use of tuberculin, weighing 125 lb. each, in addition to their regular food were each fed 1 oz. of tuberculous butter daily for thirty days, or one month. Each hog thus received less than 2 lb. of butter during the month, or less than is usually eaten by persons of the same weight. The butter was made with cream obtained from milk naturally infected with tubercle bacilli, and every particle of this butter, which was salted at the rate of 1 oz. of salt to the pound, was three months old, or older, at the time it was fed to the hogs. The hogs were kept under conditions under which no hog among the many used at the Experiment Station ever contracted tuberculosis from an accidental or unintentional cause. As the result of feeding the butter three of the four hogs became affected with typical tuberculosis.

More direct evidence that tuberculosis may be contracted through eating infected food, or more direct evidence to prove that tubercle bacilli may remain alive and virulent in ordinary salted butter for three months or a quarter of a year, would be difficult to obtain.

(8) As as been shown by numerous other investigators, it was found, contrary to the length of time tubercle bacilli live in butter, that they die very rapidly on exposure to light and drying. Sunlight is so potent a factor in the sterilization of tubercle bacilli that it is doubtful whether a sticky, tough substance like tuberculous sputum can reach a sufficiently fine state of pulverization to float in the air as a respirable dust without first losing its infectious character.

The Frequency of Tubercle Bacilli in Milk.

When we bear in mind that probably not less than 20 per cent. of our American dairy cows are to some extent affected with tuberculosis (the percentage among the cows in European countries is much higher) and that fully 40 per cent. of all tuberculous cattle, even when they retain the appearance of health, more or less intermittently expel tubercle bacilli from their bodies with the material (fæces) that is the

commonest, nearly a constant, impurity in milk, we cannot fail to realize that tubercle bacilli must be of frequent occurrence in the milk currently sold for use as human food, and this is precisely what we find to be true when we turn our attention to an examination of market milk.

Numerous tests of milk purchased at Washington, D.C., showed that one among every eighteen samples contained tubercle bacilli, and that one among every ten dealers sold infected milk, notwithstanding that the percentage of tuberculous cows among those from which the Washington milk supply is derived seems, from the tuberculin tests that have been made, to be comparatively low.

Few dairies distribute infected milk continuously. In most instances the distribution is intermittent. This seems to be a matter of some importance, because the extent to which public health is exposed to infected milk depends rather upon the number of dairies that distribute it than upon the percentage of milk samples found to be infected among the number examined, and because experience has shown that it is practically impossible, without an enormous amount of work, to prove definitely that any one dairy constantly sells or distributes milk wholly free from virulent tubercle bacilli. For example, one test of the milk from a dairy at Washington showed it to contain tubercle bacilli. Some time afterwards samples of milk from this dairy were tested on each of thirty consecutive days. Among the thirty samples those of the second, third, and eighth days caused typical, fatal, generalized tuberculosis in guinea-pigs, and those of the remaining twenty-seven days were found to be free from tubercle bacilli. Hence the fact that this dairy was intermittently distributing tuberculous milk would have escaped detection if as many as twenty-two samples of milk, taken on twenty-two consecutive days, beginning on the ninth day of the actual examinations, had been tested.

Professor Eber, of Leipzig, gives some figures which are interesting in connection with the intermittent distribution of infected milk by daries. He tested the milk sold by seventy dealers on three different dates. On the first date six dealers, on the second nine, and on the third seven were found to be selling tuberculous milk. The dealers who sold infected milk on the three dates are not always the same dealers, so that if we sum up the actual number who at one time or another sold tuberculous milk we have the number nineteen, and this is equivalent to the charge that three examinations of the milk sold by seventy dealers showed that 27·1 per cent., or more than one in four, from time to time sold tuberculous milk. Had Eber made a few more

series of tests with the milk of the seventy dealers he probably would have found that even a larger percentage from time to time sold tuberculous milk.

The manner in which tubercle bacilli are expelled from the bodies of tuberculous cattle, frequently long before the remotest symptoms of disease are manifest, teaches that we cannot hope to obtain milk from tuberculous cattle or from healthy cattle exposed in the environment of tuberculous cattle at all times free from tubercle bacilli; and the intermittent character of the distribution of tuberculous milk by dairies teaches that no milk is constantly safe unless it is obtained from cows that have been shown by the tuberculin test to be free from tuberculosis and that are milked, housed, fed, pastured, and in every way kept in an environment from which all tuberculous and all untested cattle are excluded.

Pasteurization as an Expedient.

The amount of milk that can actually be produced under the conditions required to insure its freedom from tubercle bacilli must be, for some time to come, a relatively small proportion of the total supply, and therefore we are obliged to look for some expedient through the use of which milk, when it is not produced under ideal conditions, can be made a safe article of food. The least expensive and most efficient available expedient is pasteurization.

Pasteurization is a definite process, which must not be confounded in our minds with sterilization, scalding, boiling, &c. The proper pasteurization of a delicate, unstable substance like milk, strictly speaking, signifies its exposure to a degree of temperature that will not markedly alter its character for a sufficient period of time to kill nonsporulating disease germs. The minimum effective temperature is 60° C., and this should be maintained at least twenty minutes; the maximum temperature that does not cause objectionable modifications is 70° C., and this is sufficient to kill the disease germs of commoner occurrence in milk in ten minutes. The term "pasteurized milk" should be limited to milk which has been heated between 60° and 70° C. from ten to twenty minutes. Milk heated to a higher degree, or for a shorter period of time, should be defined by some other term. It seems very desirable that some authoritative body, conversant with the milk question, should write a clear definition of just what meaning is to be attached to the term "pasteurized" as applied to milk. Possibly it would be wise to drop the word "pasteurized"

altogether, and to substitute some such term as "hygienically heated milk."

The fact that tubercle bacilli in milk rise as abundantly with the cream as they gravitate with the sediment, and the two facts that the bacilli in cream are transferred to the butter made from it and in butter find an ideal medium for the preservation of their life and virulence, teach that all cream should be obtained from the milk of cows certainly free from tuberculosis, or that it should be pasteurized or hygienically heated before it is used as food in the form of cream or for making butter. It has been conclusively shown that good butter can be made from pasteurized cream.

Though pasteurization is so strongly advocated, we should not lose sight of the fact that it is, after all, simply an expedient, and as such can not be used as a final solution of the milk problem. Above all it should not be used as an excuse for relaxing our efforts to secure milk that is perfectly safe without treatment of any kind, and its use to preserve dirty and otherwise marketable milk should under no circumstances be tolerated. That is to say, so long as the pasteurization of milk and cream is necessary as an expedient to protect public health, let us by all means practice it, but while practising it let us continne to insist that established standards of purity shall be maintained, and that these standards shall gradually be made higher and better.

SOME REASONS FOR GUARDING AGAINST INFECTED DAIRY PRODUCTS.

When we consider the sources from which the tubercle bacilli that make tuberculosis the commonest disease with which the human race is affected are derived, it is well to remember that tuberculosis has a unique place among pathological conditions. It is one of the relatively small number of infectious diseases that attack more than one species of animals, and it is the only known infectious disease from which practically no vertebrate species is immune. It has received more attention from investigators in the realms of both human and veterinary pathology, bacteriology, and hygiene than any other disease, and yet our knowledge regarding it has remained in many respects exceedingly rudimentary. We know, for example, so little about its period of incubation that we cannot say who is right—those who believe that tuberculosis arises from infection that may enter the body at any time of life, or those who believe that it almost constantly develops from latent tubercle bacilli taken into the body during the milk-drinking period.

We do know that tuberculous lesions of greater or lesser magnitude and varying stages of activity are found on autopsy with a frequency that prompts the conclusion that few persons wholly escape the tubercle bacillus. We know that tuberculosis is a disease that develops with a peculiar frequency during those periods of life when the drain on the mental and physical forces is greatest, rather than during periods following incidents of exceptional exposure to infection. We know that the children of tuberculous parents succumb to tuberculosis—not necessarily as children—more commonly than those of healthy parents; and we know that tuberculosis is not as common among those persons who have been unusually exposed to infection as we naturally have reason to expect it to be. Men with tuberculous wives and women with tuberculous husbands, when their family records are clean, relative to tuberculosis, contract the disease so rarely that their presumably intense exposure cannot certainly be said to infect them more frequently than persons in general become infected.

We know that tubercle bacilli are peculiar in that they may remain alive and virulent long periods of time in circumscribed closed tuberculous lesions, and we have reasons to believe that actually latent tubercle bacilli may remain in the body indefinite periods of time without causing conditions that can be identified as tuberculosis; and, finally, we know that sensibly active tuberculosis during child life is an extremely serious disease, and most apt to have a fatal termination.

Add to this that tubercle bacilli in dairy products are either in a fresh or in a well-preserved state; that their introduction into the body is direct and occurs with the use of indispensable articles of food; and that tubercle bacilli in sputum, which were long regarded as the commonest and most active cause for the propagation of tuberculosis, are exposed to conditions that almost certainly sterilize them before the sputum can be pulverized and float in the air; and we may conclude that, whatever chances we, as adults, may be willing to take in the form of exposure to tubercle bacilli in milk and dairy products, we should not be derelict with the exposure of children. It is for the sake of children especially, the little beings whose welfare is a sacred obligation that stands second to nothing, that the fight for pure milk should be made so strong that it will overwhelm every opposition.

NOTES ON TRYPANOSOMES OF THE DIMORPHON GROUP.

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AND

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In view of the recent attention that has been given to the trypanosomes of the dimorphon type, it may appear unnecessary to recapitulate the circumstances which have given rise to so much discussion. It will be remembered that in 1902 Dutton and Todd encountered in the blood of horses in Senegambia a trypanosome having three forms, namely: (1) A long, slender form with free flagellum; (2) a so-called "stumpy" form; (3) a short "tadpole" form.

Recently, in working with the strain of parasite brought back from Africa by Dutton and Todd, various observers—viz., Thomas, Breinl, Laveran, and Mesnil—have failed to see the long forms with thin body and free flagellum originally described, and it is suggested that Dutton and Todd were dealing with a mixed infection, one of which has died out. Mesnil has expressed his opinion that the original *Trypanosoma dimorphon* described by Dutton and Todd included *T. dimorphon* (*sensu* Laveran and Mesnil), *T. cazalboui* (Laveran), and *T. pecaudi* (Laveran), since these species can occur at one and the same time.

Montgomery and Kinghorn have explained that the trypanosome which Dutton and Todd described did not come from the animal which was the source of all the European strains of *T. dimorphon*. The latter statement arose from the fact that Montgomery and Kinghorn had encountered in animals at Broken Hill, North-Western Rhodesia, the same types of trypanosomes as those first seen by the original observers in Senegambia. The following observations have a bearing on the question.

Blood was obtained by Mr. MacKnight from a cow dying of typical trypanosomiasis at Broken Hill, and inoculated subcutaneously in doses of 40 m into six lacal fat-tail sheep which were sent by rail to Salisbury, in order that a strain might be established for comparison with the trypanosomiasis of live stock in Southern Rhodesia. The sheep were inoculated on February 13, and were received at Salisbury six days later. For the purposes of this note it is unnecessary to give full details of the temperature and trypanosome records of these sheep, but the following table is of interest:—

	Sheep No.					
	1.	2.	3.	4.	5.	6.
Period of incubation in days	14	15	15	15	17	17
Duration of disease in days	52	35	80	34	80	34

No long form of trypanosomes with undoubted free flagellum was ever encountered in any of these sheep during the whole course of the disease, but the examination of a great number of blood preparations has enabled us to classify the forms met with under the types (*c*), (*d*), (*e*), a system of classification which will be explained later in the course of this note.

From sheep No. 2, 1 c.c. of warm blood was taken on March 12, and was injected subcutaneously into a white rat. On the third day after—somewhat to our surprise, seeing that Montgomery and Kinghorn state the period of incubation in these animals to be six to ten days—we found the blood of our rat to contain a considerable number of trypanosomes. On an average in each field examined under a $\frac{1}{12}$ oil immersion and 3 eyepiece one trypanosome was encountered. Still more surprised were we to find that the parasites met with were of the long free-flagellated variety, and were present in apparently pure culture, since Montgomery and Kinghorn found in their inoculated rats that "tadpole" forms predominated throughout the first few days of the disease. Indeed, from the morphology and short period of incubation, we at first regarded these as *T. Brucei*, a diagnosis which subsequently was proved to be incorrect. During the next few days careful examination of this animal's blood was frequently made, and day by day the long forms with free flagellum became less numerous, while other forms of all gradations, from the long form to the "tadpole" type, made their appearance. The drawings from actual specimens made to scale, but admittedly diagrammatic, show the various types met with, and explain the impression forced upon us that the long type, for reasons unknown, became differentiated or replaced by other shorter types in descending scale until the shortest, or "tadpole," form was evolved.

In the long form, the portion of the protoplasm posterior to the micronucleus was elongated and tapering (*effillée*)—sometimes as long as 5 mm.—but in the descending forms it became shortened and rounded relatively to decreasing total length of the parasite until the rounded end of the "tadpole" type was reached. In the same manner, and in direct proportion to the above changes, the free flagellum shortened and finally disappeared. Similarly, the festooning of the undulating membrane, most elaborate in the longer forms, became gradually less until, in the "tadpole" types, it was almost

inappreciable. But the difference between the nucleus and the micronucleus did not appear to decrease in direct ratio to the reduction in the total strength of the parasite, so that in the "tadpole" forms the nucleus was relatively nearer the anterior than in the longer forms.

On this basis we have established a system of classification of the various types under the headings (*a*), (*b*), (*c*), (*d*), (*e*), according to their resemblance to the forms pictured in the drawing. For obvious reasons we prefer this system to the use of the terms "long," "stumpy," and "tadpole." As far as this trypanosome of North-western Rhodesia is concerned, we agree with Montgomery's deduction that: "We

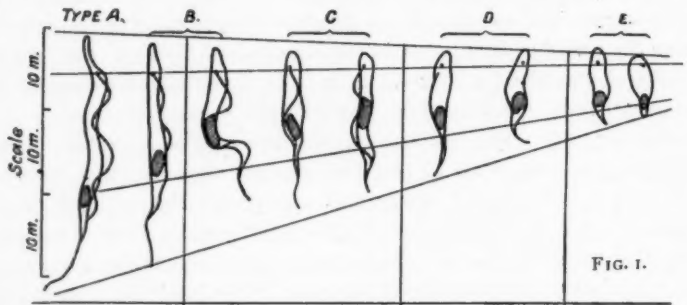

FIG. 1.

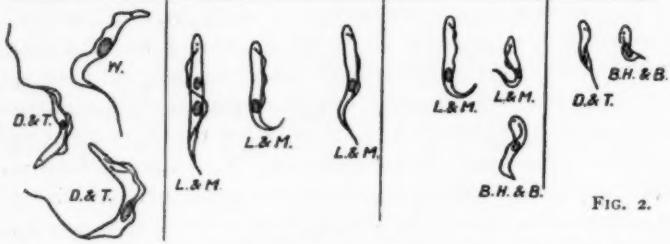

FIG. 2.

FIG. 1.—Drawings of trypanosomes seen in a rat inoculated with the animal trypanosome of North-west Rhodesia, showing transmission from the "long" to the "tadpole" form.

FIG. 2.—Tracings of illustration of *Trypanosoma dimorphon* after various authorities. Scale not uniform.

D. and T. = Dutton and Todd; L. and M. = Laveran and Mesnil; W. = Wellcome Laboratories Report; B., H. & B. = Bruce, Hamerton and Bateman.

have here, then, a trypanosome whose prevailing type is naturally and experimentally infected animals is short, measuring only 9·75 to 15·3 μ, and from which there is a relative absence of a flagellum. This type, under the influence of a different host, or under natural conditions in the same animal, assumes a distinct form, which measures from 25 to 31 μ in length, and possesses a flagellum which may be upwards of 10 μ long."

As far as the species under our consideration is concerned, we prefer to accept this interpretation to the possible explanation that we have to deal with a multiple infection. For if the long form were *T. brucei*, or allied species, we should have expected it to persist, whereas it became replaced by the smaller forms, which in the later stages of the disease were alone present. Further, for us, it would have been impossible to define where the transmission from one type to another took place. We, therefore, submit that our long form cannot have been *T. brucei*, *T. evansi*, *T. lewisi* (which does not occur in the rats at this laboratory), *T. cazalboui* (to which rats are refractory), *T. vivax* (of greater motility), &c., but consider that we were dealing with a parasite which, under certain conditions, assumes various forms, ranging from the so-called "long" type (*a*) to the "tadpole" (*e*).

We are unable to define exactly the factors which give rise to the assumption of any particular type, but from the many observations we have made we are inclined to the opinion that the "long" forms occur when conditions are favourable to the parasite, while the smaller types appear when adverse conditions arise. Thus, in animals which have a natural resistance to the organism, or in cases running a chronic or subacute course, types (*c*) to (*e*) prevail, but these forms introduced to animals which offer little resistance, or in which the disease runs an acute course, are outnumbered by the types (*a*) and (*b*). These, however, even in acute infection, are occasionally replaced by the smaller forms. This is especially noticeable in cases where death is imminent.

Thus it would appear that such circumstances as the production of anti-bodies by the host, or the unsuitability of the medium for the existence of the parasite in the host about to die, give rise to the smaller forms, which may be regarded as "types de résistance."

Applying this hypothesis still further, we would advance the suggestion that the numerous varieties of animal trypanosomiasis met with in the Continent of Africa may have had a common origin, their subsequent minor points of difference having been brought about by natural conditions of passage, transmission, and environment—conditions which have not been duplicated in the laboratory.

ADDENDA.

Trypanosomiasis of Southern Rhodesia.

It may be mentioned that while investigating the course of the animal trypanosomiasis of Southern Rhodesia in naturally and arti-

ficially inoculated animals, we have never encountered forms comparing with types (*a*) or (*e*), as met with in the North-western Rhodesian subinoculation. The Southern Rhodesian trypanosome ranges between (*b*) and (*d*).

Classification.—At the present time there appears to be a desire to simplify the classification of the many described species of trypanosomes of so-called dimorphic type. One of us has received a letter from Colonel Sir David Bruce, in which he writes: "I imagine the type you find in your cattle"—(*i.e.*, Southern Rhodesian)—"is similar to that found by us commonly in Uganda cattle. It seems to me that for the present we should look upon your type, Theiler's Portuguese West Africa trypanosome, the Uganda ones, and the one I described from Zanzibar, as being *for practical purposes* the same species. I also imagine that the trypanosome Dutton and Todd were working with on the West Coast was the same. They were probably dealing with mixed infection, and so got the long forms."

Types de résistance.—Bruce has recently criticized the theory that the "long" and "stumpy" forms of *T. gambiense* represent male and female respectively. Following up our observations on the animal parasite we have been able to apply our theory to the human trypanosome, and consider that the long form predominates where the infection is most severe, and *vice versa*.

MELANOTIC INFILTRATION OF HEPATIC CELLS IN SHEEP.

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At the Melbourne City Abattoir it is not rare to find in otherwise apparently normal sheep the whole of the liver distinctly black or brownish-black in colour. The cause of this condition has so far not been traced, although I am informed by the Chief Inspector, Mr. John Robertson, an extremely careful and reliable observer, that sheep from a certain small paddock in the vicinity some time after a heavy flood are often found to be so affected.

During the first week of July last year, through the courtesy of Mr. Robertson, I had the opportunity of examining five livers exhibiting this peculiar abnormal colour in varying density. Unfortunately, as the animals belonged to different butchers, no definite

information could be secured regarding the exact age of the sheep, or even the district in which the sheep had been bred or fattened.

The livers so far as size, shape, consistency, &c., were concerned were all normal; the sole evidence of disease to the naked eye was the altered colour.

The general appearance of each liver was as follows:—

(1) A diffuse homogeneous dark-brown tint permeating the whole structure.

(2) A darker brown, almost black coloration throughout.

(3) Black or bluish-black at first glance. When examined carefully on section, however, the cut surface was seen to be mottled, each individual lobule appearing to show a small brownish centre with a darker brown periphery.

(4) Black or bluish-black in appearance. When placed in preservative, however, the cut surface developed again a mottled appearance, and careful examination showed this to be due to the periphery of each lobule being decidedly darker than the centre.

(5) Organ homogeneous in colour, being of a distinct uniform black. In this case the organ seemed to be more dense than normal.

The lymph glands of each liver were slightly darker than usual, those of No. 5 being markedly so.

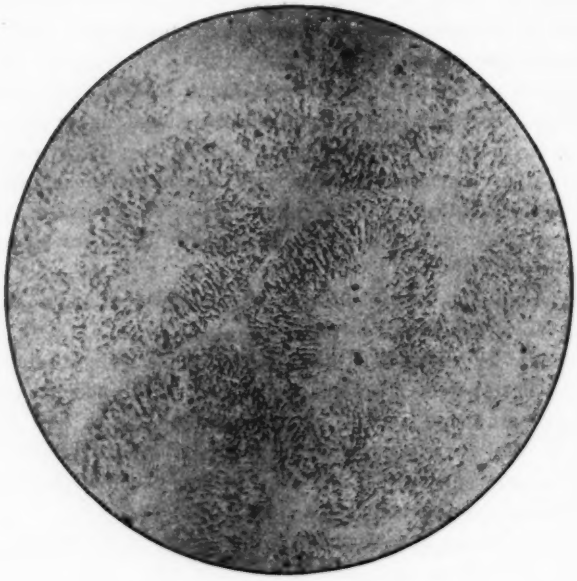
It should be noted that these cases are placed according to the extent of the apparent affection, not as they were encountered. The first three were found last and on the same day. It is well that this should be stated, as otherwise it might be inferred the condition rapidly became aggravated, and that all had become affected in the same locality and about the same time.

It may also be noted that the cut surface, if allowed to rest on paper for some time, soon stained it a dark tint. The nature of the pigment present in the liver was determined by Dr. A. C. H. Rothera, Lecturer and Demonstrator in Biochemistry at Melbourne University, who kindly handed me the following note:—

"The pigment was shown to be neither a bile pigment nor blood pigment, nor yet any pigment usually derived from these. It was insoluble in water, alcohol, or ether, but dissolved in dilute alkalis (1 per cent. NaOH) to form an intensely dark-brown solution. Addition of acid then caused a bulky precipitate, including the pigment. This behaviour is characteristic of the 'melanins'—a class of pigments about which very little is known chemically, or as to their formation. They contain nitrogen, and the class includes the pigments

of the hair, and of black pigment cells, as in the retina ; the pigment of melanotic sarcomas, and the pigments so frequently formed in the hydrolysis of proteins."

Histology.—Microscopical examination in each case shows the pigmentation to affect the hepatic cells, principally those of the periphery of the lobules (see photomicrograph). The outer cells are the most severely affected, in some cases the nucleus being almost completely obscured. Gradually passing inwards towards the centre of the lobule, the cells are seen to be less and less affected, although



Section of the Sheep's Liver. × 50.

even in the lightest coloured livers a few distinct granules may be observed in the majority of the epithelial cells.

In addition to the infiltration of the hepatic cells proper, there are present between the rows a number of large free cells crowded with granules, so much so as to completely obscure the nucleus. These pigmented free cells vary in size and in shape, and are evidently situated chiefly within the hepatic capillaries. They may also, however, be seen within the intralobular veins in considerable numbers,

and even here and there in sections of the portal vein. These free cells are evidently white blood corpuscles of macrophage type. In addition to being found in the liver, the lymphatic glands of the organ show these pigmented cells in varying numbers, depending upon the intensity of the liver pigmentation.

It is unfortunate that such cases are only observed after slaughter, as doubtless the blood would give interesting results on examination.

In none of the cases examined did the epithelia of the bile-ducts or the connective-tissue stroma of the organ show any pigmentation. In each liver the pigment is present in the form of small irregular dark-brown granules, which are most readily studied when sections are unstained, or at most stained with eosin alone. Whether the leucocytes which are seen crowded with the granules in the small blood-vessels and capillaries are conveying the pigment to the liver or are removing it therefrom cannot, of course, be determined by these cases; but, in view of what is generally known of pigmentation, the former appears probable, especially as they are evidently becoming entangled, or at least delayed in their passage through the organ.

Records of Pigmentation in Sheep's Liver.

According to Cadeac ("Pathologié Interne, Pancreas, Foie, &c., 1910") a pigmentary degeneration of the liver in Russian sheep has been studied by Siedamgrotzky in 1874, and by Barrier during 1877. Macroscopically the appearance resembles strongly those described above. The colour of the affected organ is "black, bluish, or brownish-black, equally pronounced at the external surface as on the surface of the organ. . . . Sometimes even the coloration is so intense and so general that the preparations give to the water a black colour, as of ink."

The nature of the pigment and the appearance microscopically do not, however, seem to be identical. "One may see the pigment deposit as distinctly in the cells of the organ as in the interstitial connective tissue and the walls of the vessels."

Indexed B. A. I.

EXPERIMENTS IN CONNECTION WITH THE TREATMENT OF CATTLE AFFECTED WITH REDWATER, WITH TRYPANBLUE, AND TRYPANRED.

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In 1909, Nuttall and Hadwen [1] published the results of experiments which they had been conducting on the use of certain dyes named trypanred and trypanblue, in the cure of canine piroplasmosis. The results obtained were very satisfactory, the latter-named drug being found to have a direct destructive action upon the causal organisms. The use of trypanred was found to have less influence upon the course of this disease.

Towards the end of the year, these observers conducted experiments upon the cure of piroplasmosis (redwater) in cattle. The strain of piroplasm which they used was originally obtained from South Africa in 1904. The experiments were conducted in England. In the experiments performed, nine cows were used, all being inoculated with virulent blood. Five of them were subsequently treated with the drug trypanblue, and four remained untreated—*i.e.*, as controls. Of these, the five treated cows recovered. On the other hand, only one of the four untreated ones died. The authors concluded that "Trypanblau promises to be an efficient remedy for bovine piroplasmosis."

There is no doubt that the use of trypanblue in cases of redwater in cattle gave promise that at last a remedy against this disease, which causes such heavy loss in Queensland, had been discovered. On the other hand, however, it appeared that the experiments in question were not of sufficient severity, seeing that only one of the four untreated animals died, to justify one in concluding that the remedy would be of sufficient value in Queensland to warrant one in recommending its use without further experiment.

One of the reasons for the advisability of experimenting with the drug here, was that redwater varies considerably in its degree of virulence in different parts of the State. In some localities 50 per cent. or more may die from tick fever alone where the cattle are highly susceptible, and the disease strikes the farm with its full force, as it were.

On the other hand, there are many places where either the cattle

[1] A full abstract of the work of these investigators was published in the Veterinary Journal for January, 1910.

have some slight immunity, or the disease is not so virulent, and the losses are not much more than 5 per cent.

In consequence of this, it will be seen that were cases affected with the disease in a mild form used for experiments, the conclusions drawn from the results might not have the significance one would wish, for one might be attributing to the use of the drug cures which Nature unaided would have effected herself. On the other hand, however, if in the experiments to be performed the most virulent strain of redwater blood obtainable were used, one could justifiably conclude that whatever good effects, if any, the drug had on cattle infected with this blood, the same results, or even better, would follow the use of the drug in cattle affected with the milder form of the disease.

It was with this in mind that the following experiments were carried out at the Experiment Station, Yeerongpilly, during the early part of the present year. The strains of piroplasm used in the experiments were obtained from two sources, viz.:—

(1) *Heifer No.* 18.—Original source-bleeder "S." An animal used for inoculation, and whose blood is known to be very virulent. The blood from No. 18 will be seen in the following experiments to be of very high virulency.

(2) *Cow No.* 28.—This animal was infested on January 19, 1910, with ticks from Geraldton, North Queensland. The ensuing reaction was very severe, and the cow died on February 4, 1910, sixteen days from the time the larval ticks were placed upon her.

Owing to an error on the part of the agents in London, only trypanred was sent out in the first place; as a consequence, the matter being of importance, it was decided to conduct the first experiments with this dye, although it had not proved such a success in connection with canine piroplasmosis as trypanblue. For this purpose four adult cows, Nos. 20, 21, 22, and 23, obtained from a tick-free district (the Darling Downs), were each, except No. 21, which had 45 c.c., inoculated subcutaneously with 50 c.c. defibrinated blood from heifer No. 18. Three—viz., Nos. 21, 22, and 23, were treated with trypanred, whilst No. 20 remained untreated as a control.

The following is the record of the experiment:—

EXPERIMENT No. 1, WITH TRYPANRED.

Cow No. 21, *aged.* (*Treated.*) *December* 9, 1909.—Inoculated subcutaneously with 45 c.c. defibrinated blood from heifer No. 18. Temperature reaction began on the sixth day after inoculation, and parasites appeared on the eighth day. Trypanred was injected on the twelve day, and death occurred twenty-one days' after inoculation of blood. (See Table I.)

Post-mortem examination did not reveal many lesions of piroplasmosis (redwater). The heart, however, was very flabby and below the normal size.

Cow No. 22, *aged.* (*Treated.*) *December* 9, 1909.—Inoculated subcutaneously with 50 c.c. defibrinated blood from heifer No. 18. Temperature reaction began on the sixth day, and parasites appeared on the eighth day after inoculation. Trypanred was injected on the twelfth day. (See Table II.)

Severe blood lesions in the shape of poikilocytosis, polychromatophilia, punctate basophilia, appeared on the twenty-seventh day, and lasted until the sixty-first day. The blood-count fell to 3,200,000 per c.mm. on the twenty-eight day.

TABLE I.

Days after inoculation	Temperature		Parasites	Urine	Remarks
	° a.m.	° p.m.			
6	101·8	102·8	Absent	Normal.	
7	102·4	102·6	,,	,,	
8	102·8	103	Scanty	,,	
9	103·4	104	,,	,,	
10	104·4	104·2	—	,,	
11	104·2	105	Absent	,,	
12	104·6	105·4	Fairly numerous	,,	Cow ill; fæces dysenteric; 2 p.m., 2 grm. trypanred in 100 c.c. water injected intravenously.
13	105·6	105·8	,,	,,	
14	104·4	104·6	Absent	,,	Pulse weak; irregularly intermittent.
15	102·6	103·4	,,	,,	As before; mucous membranes cyanosed; cow very ill indeed.
16	102·4	102·4	,,	,,	
17	102·2	102·2	,,	,,	Cow very weak, but a little better.
18	103·2	103·6	,,	,,	
19	103·4	103·6	,,	,,	
20	102·8	103·6	,,	,,	Cow eating a little, but condition grave.
21	102·8	—	,,	—	Cow moribund; pulse irregularly intermittent and very feeble.

Died 2 p.m. twenty-one days after inoculation.

Cow No. 23, *aged.* (*Treated.*) *December* 9, 1909.—Inoculated subcutaneously with 50 c.c. defibrinated blood from heifer No. 18. Temperature reaction began on the sixth day after inoculation, and parasites appeared on the eighth day. Trypanred was injected on the ninth, and death occurred on the sixteenth day. (See Table III.)

The blood-count fell to 3,800,000 per c.mm. on the thirteenth day after inoculation.

Post-mortem examination revealed typical lesions of acute piroplasmosis (redwater). The urinary bladder contained about a quart of port-wine-coloured urine.

Cow No. 20, *aged.* (*Untreated.*) *Control. December* 9, 1909.—Inoculated subcutaneously with 50 c.c. defibrinated blood from heifer No. 18. In

this case parasites appeared before the temperature showed any marked rise—viz., on the eighth day, temperature reaction commencing on the ninth day. Death took place thirty days after inoculation. (See Table IV.)

The blood-count fell to 2,000,000 per c.mm. on the twenty-ninth day.

Post-mortem examination showed characteristic lesions of chronic piroplasmosis (redwater).

TABLE II.

Days after inoculation	Temperature		Parasites	Urine	Remarks
	° a.m.	° p.m.			
6	101·4	104	—	Normal	
7	105·8	106·2	—	,,	
8	105·6	105·4	Scanty	,,	
9	103·2	104·4	Absent	,,	
10	105	105	,,	,,	
11	105·2	105·4	Rings and rods fairly numerous	,,	
12	106·2	107·4	Numerous	,,	10·30 a.m., animal very ill; injected intravenously 2 grm. trypanred in 100 c.c. sterile normal salt solution.
13	105·4	105·8	Absent	,,	
14	103·6	104·2	,,	,,	
15	103·4	103·6	,,	,,	
16	103·8	102·4	,,	,,	
17	101·4	100·8	,,	,,	Cow aborted; animal looks fairly well.
18	103	103·4	,,	,,	
19	102·2	102·6	,,	,,	
20	101·8	102·2	,,	,,	
21	103·4	106·4	,,	,,	
22	101·6	102·6	,,	,,	
23	102·6	102·4	,,	,,	
24	102	102·8	,,	,,	
25	101·4	102	,,	,,	
26	102·8	103·4	Scanty	,,	
27	101·8	102·4	Absent	,,	
28	101·8	102·2	Fairly numerous	,,	Animal feeding and looking well.
29	Normal		—	—	
66	Normal		Scanty	—	Animal well.

Recovered.

Summary of Experiment No. 1.

In this experiment four susceptible adult cattle were used. They each had the same quantity of blood, viz., 50 c.c., injected, with the exception of No. 21 which had 45 c.c. Three animals, viz., Nos. 21, 22, and 23, were treated with the drug trypanred. One, No. 20, remained untreated as a control.

The disease resulting from the inoculation was in each case very severe. Two of the animals treated, viz., Nos. 21 and 23 died, as also did the control animal.

In No. 21 2 grm. of trypanred was injected on the twelfth day

after inoculation, and soon after clinical symptoms had become established.

The drug appeared to have an effect in reducing the number of parasites in the blood, and to some extent in lowering the temperature. It did not, however, have any lasting effect in staying the course of the disease, the animal dying on the twenty-first day after inoculation from acute piroplasmosis (redwater).

TABLE III.

Days after inoculation	Temperature		Parasites	Urine	Remarks
	° a.m.	° p.m.			
5	101·8	101·8	Absent	Normal	
6	102	103·4	,,	,,	
7	102·6	102·8	,,	,,	
8	105·2	106·8	Numerous	,,	Animal ill; fæces blood-stained; not feeding.
	10 a.m.				
9	106·4	—	,,	,,	11 a.m., injected intravenously 1 grm. trypanred in 50 c.c. water.
		1 p.m.			
,,	—	108	—	,,	Pulse rapid and weak; not feeding.
		5 p.m.			
,,	—	105·4	—	,,	Fæces dysenteric; discharge from notrils.
		8 p.m.			
,,	—	102·8	—	—	
10	106·6	106·2	Absent	Normal	Mucous membranes congested. 5 p.m., injected subcutaneously 1 grm. trypanred in 100 c.c. water.
11	105·8	107·2	,,	,,	Animal much brighter.
12	106·4	106·6	,,	,,	
13	106·2	106·8	Scanty	—	
14	105·8	105·8	,,	Normal	
15	101·2	102·8	,,	,,	Relapse; extremities cold; pulse weak.
16	96	—	—	—	Semi-conscious; otherwise as before.

Died noon on sixteenth day after inoculation.

In cow No. 22, 2 grm. of trypanred were injected intravenously on the twelfth day after inoculation. There had been a fairly high temperature for a few days previously, but otherwise there were very few signs shown by which the stock-owner would know that his animal was ill, the appetite also remaining good. On the day of injection of the drug, however, the cow was manifestly very ill. On the day following the use of the drug the parasites had disappeared from the peripheral blood. There, however, did not appear to be any great effect upon the temperature which gradually reached the normal on the seventeenth day. There was a slight relapse on the twenty-eighth day when parasites were fairly numerous. Parasites again appeared on the sixty-sixth day after inoculation, but the animal remained well.

With cow No. 23 the drug was injected, viz., 1 grm. intravenously, at 11 a.m., on the day following the onset of symptoms and the appearance of parasites. There was in this case a marked and immediate effect upon the temperature which commenced to fall two

hours afterwards, the temperature at 1 p.m. being 108° F., and at 8 p.m. it had fallen to 102·8° F. At 9 a.m. the following morning, however, it had again risen to 106·6° F. At 5 p.m. the same day 1 grm. of trypanred was injected subcutaneously, but this time no effect in lowering the temperature was produced. The parasites, which were numerous on the morning of the first injection, had disappeared on the next day, the tenth, but they reappeared on the thirteenth day, and persisted until death took place on the sixteenth.

TABLE IV.

Days after inoculation	Temperature		Parasites	Urine	Remarks
	° a.m.	° p.m.			
8	102	102·2	Fairly numerous	—	
9	102·6	103·4	Numerous	—	
10	105·4	105·4	Absent	—	
11	105·2	106·4	Scanty	Marked redwater (hæmoglobinuria)	
12	105·8	106·2	Absent	Slight do.	
13	105·4	106·4	,,	Normal	Animal looking very ill.
14	105·2	105·6	,,	—	Fæces dysenteric.
15	104·2	105·2	,,	—	
16	104·8	104·4	,,	—	
17	104	104·4	,,	—	
18	104·6	105·2	,,	—	
19	102·6	103	,,	—	
20	104·6	104·2	,,	—	
21	102·4	102·8	,,	—	
22	102·6	104·6	,,	—	
23	103	101·6	,,	—	
24	101·8	101·8	,,	—	
25	102	104·2	,,	—	
26	104·2	103·8	,,	—	
27	103·4	102·8	,,	—	Cow lying down, but does not seem seriously ill. Feeding fairly well.
28	102·6	102·8	Very numerous	—	
29	104·4	104	Fairly numerous	—	Not so well.
30	101·8	—	Very numerous	—	

Died noon on thirtieth day after inoculation.

In this case the drug appeared to have an effect upon the parasites, but not a permanent one. It also had a marked effect upon the temperature soon after injection, but this was only transitory, a subsequent injection the next day had no effect at all. There was also some slight improvement in the animal's condition soon after the use of the drug, but this again was only temporary.

The control cow, No. 20, lived longer than two of the treated animals, viz., thirty days after inoculation, it finally dying from chronic piroplasmosis (redwater).

Conclusions.—Whilst the injection of trypanred appears to have

some effect in destroying the parasites in the blood of an animal affected with redwater, its effect in reducing the temperature in severe cases is uncertain. The effect of the drug in arresting the course of the disease in severe cases is slight, even when animals are treated early. It would, therefore, appear that the use of the drug trypanred has not been attended with such results as would justify its further use in the field.

Experiment No. 2, with Trypanblue.

In this experiment highly virulent blood was used taken from cow No. 28, which died a few days later from redwater. The disease in No. 28 was communicated by larval ticks, the progeny of some adult ticks taken from a natural and fatal case of redwater at Geraldton, North Queensland.

Table V.

Days after Inoculation	Temperature		Parasites	Urine	Remarks
	° a.m.	° p.m.			
1	101·4	102·8	Absent	Normal	
2	103	105·8	,,	,,	Animal looking dull.
3	105·8	106·6	,,	,,	
4	102·2	102	,,	,,	
5	107·2	105·8	Scanty	,,	Cow ill; not feeding well.
6	106·4	105·8	,,	,,	,, ,,
7	106·2	106·2	,,	,,	,, ,,
8	106·6	107	,,	,,	Cow worse; not feeding; fæces blood-stained.
9	106·2	105·8	,,	,,	1 p.m., injected intravenously 1 grm. trypanblue in 100 c.c. water.
10	105·4	106	Absent	,,	Feeding a little.
11	104·4	105·4	,,	,,	Still improving.
12	103·2	103·8	,,	,,	Brighter.
13	102	102·2	,,	,,	Progressing favourably.
14	Normal		,,	,,	Feeding well, but very weak.

Recovered.

In this experiment the use of trypanblue was not commenced until the disease had become well established in the animal, in order to ascertain what effect the drug had at this stage, as in practice with the majority of animals naturally contracting redwater in this State, the disease would, when taken in hand for treatment, be well advanced. This experiment would, therefore, more nearly approach the conditions met with in the field.

Cow No. 29, *aged.* (*Treated.*) *February* 2, 1910.—Inoculated subcutaneously with 60 c.c. blood from cow No. 28. (See Table V.)

Parasites were never numerously present, but the anæmia resulting from the disease was fairly severe. Blood lesions, viz., poikilocytosis, polychromatophilia, punctate basophilia, &c., appearing on the thirteenth day. The blood-count fell to 4,000,000 per c.mm.

Cow No. 30, *aged.* (*Treated.*) *February* 2, 1910.—Inoculated subcutaneously with 60 c.c. blood from cow No. 28.

TABLE VI.

Days after Inoculation	Temperature		Parasites	Urine	Remarks
	° a.m.	° p.m.			
1	101·6	101·8	Absent	Normal	
2	101·8	104·6	,,	,,	
3	106	106·2	,,	,,	
4	105·4	106·6	,,	,,	Dull.
5	107·2	107	,,	,,	Looking and feeding fairly well.
6	107·2	106·4	,,	,,	,, ,,
7	106·6	107	Scanty	,,	Beginning to look ill; not feed- well; difficulty in passing urine.
8	106·4	107·2	Absent	,,	Not feeding; signs of enteritis; general symptoms of piroplas- mosis.
9	106·4	106·2	Scanty	,,	1 p.m., injected intravenously 1 grm. trypanblue in 100 c.c. water.
10	106	105·8	,,	,,	Feeding a little; pulse rapid and weak.
11	105·2	105·6	—	—	
12	105·2	104·6	—	—	Looking brighter and feeding better.
13	101·8	102·2	—	—	Still improving.
14	Nor	mal	—	—	Feeding and looking well; very weak, however.

Recovered.

TABLE VII.

Days after inoculation	Temperature		Parasites	Urine	Remarks
	° a.m.	° p.m.			
1	101·8	102·2	Absent	Normal	
2	103·8	105·2	,,	,,	
3	106·2	105·8	,,	,,	Dull.
4	104·8	105	,,	,,	
5	105	106·2	,,	,,	Not feeding very well.
6	106·4	106·6	,,	,,	
7	105·4	104·2	Scanty	,,	Commencing to look ill. Respir- ation laboured. Not feeding.
8	105·6	106	Fairly numerous	,,	Very ill.
9	106·4	106·8	Numerous	,,	1 p.m., 1 grm. trypanblue in 100 c.c. water injected intra- venously.
10	106·4	104·6	Very numer- ous indeed	—	Not feeding, but looks a little better. Pulse stronger.
11	101·4	—	—	—	9 a.m., comatose and breathing stertorously.

Died noon eleventh day after inoculation.

The reaction began on the third day after inoculation, but parasites did not appear until the seventh day. Trypanblue was injected on ninth day. (See Table VI.)

In this case, as in No. 29, parasites were scanty. Very marked

blood changes appeared on the thirteenth and lasted until the twenty-second day. Only a few blood-counts were made in this case.

On the twenty-second day an abscess appeared at the site of inoculation, but this rapidly responded to the usual treatment.

Cow No. 32, *aged.* (*Treated.*) *February* 2, 1910.—Inoculated subcutaneously with 60 c.c. blood from cow No. 28. Temperature reaction began two days after inoculation, but parasites were not observed until the seventh day. Trypanblue was injected on the ninth, and death occurred on the eleventh day. (See Table VII.)

TABLE VIII.

Days after inoculation	Temperature		Parasites	Urine	Remarks
	° a.m.	° p.m.			
1	102	102·2	Absent	Normal	
2	101·6	102·6	,,	,,	
3	104·6	105·2	,,	—	
4	103	105·8	,,	—	
5	106·8	106·6	,,	—	Dull.
6	106·8	106·8	,,	—	
7	105·8	106·4	,,	—	
8	106·2	105	Scanty	—	Not feeding.
9	106·6	106·2	,,	—	Very ill; pulse weak and thready.
10	105·2	106	Fairly numerous	—	,, ,, ,,
11	105	103·2	Numerous	—	Animal moribund.

Died at 5 p.m. on the eleventh day after inoculation.

TABLE IX.

Days after inoculation	Temperature		Parasites	Urine	Remarks
	° a.m.	° p.m.			
1	101·6	101·8	Not seen	Normal	
2	103·6	105·8	,,	,,	
3	104·8	106·4	,,	,,	
4	104·2	105·6	,,	,,	
5	107·6	107·4	Scanty	,,	Dull.
6	106·2	106	Not seen	,,	Fæces dysenteric.
7	104·6	104·2	,,	,,	
8	106·2	105·8	Scanty	,,	Mucous membranes congested; not feeding.
9	107	104·4	,,	,,	Breathing laboured.
10	103·8	103	Fairly numerous	,,	Aborted; cow very ill indeed; pulse very weak and rapid; breathing laboured: mucous membranes blanched.

Died ten days after inoculation.

Post-mortem examination revealed typical signs of acute piroplasmosis (redwater). Although no hæmoglobinuria (redwater) was observed during life, the urinary bladder was found to be full of claret-coloured urine.

Cow No. 31, *aged.* (*Untreated.*) *Control. February* 2, 1910.—Inoculated

subcutaneously with 60 c.c. blood from cow No. 28. Temperature reaction began on the evening of the second day after inoculation, but parasites were not found until the eighth day, death occurring on the evening of the eleventh day. (See Table VIII.)

Post-mortem examination showed extensive signs of acute piroplasmosis (redwater). Here, again, although no redwater was observed to be passed during life, the urinary bladder was found to contain about a quart of bright red urine.

Cow No. 33, *aged.* (*Untreated.*) *Control. February* 2, 1910.—Inoculated subcutaneously with 60 c.c. blood from cow No. 28. Temperature reaction began on the second day after inoculation, and parasites appeared on the fifth day, the animal dying on the night of the tenth day after inoculation. (See Table IX.)

Post-mortem examination showed characteristic features of acute piroplasmosis (redwater). No redwater was seen to be passed during life, but the urinary bladder was found distended with dark red urine.

Summary of Experiment No. 2.

In this experiment five adult susceptible cows were used. Three, viz., Nos. 29, 30, and 32, were treated with trypanblue; and two, viz., Nos. 31 and 33, remained untreated as controls.

Of the three cows treated with the drug, one died; both of the control animals died also.

The reaction following the injection of blood from cow No. 28 was very severe indeed, as it was intended to be. In addition to this, treatment was not commenced as soon as the animals showed manifest signs of illness, but was purposely delayed until the disease had become well established, because this would be the stage in which treatment would be most frequently begun on a farm. It will be noted that in this experiment, in every case the temperature began to rise very early—on the second or third day after inoculation. Parasites, however, were not seen until between the fifth and eighth days.

With cow No. 29, temperature reaction began on the evening of the second day, and parasites were seen on the fifth day after inoculation. During the reaction the animal became very seriously ill. Trypanblue was not used until the fourth day after the parasites had appeared, and the day following the appearance of very marked symptoms.

The parasites had entirely disappeared on the day following the injection of the drug, and the animal appeared to be a little improved. The temperature did not fall immediately after the use of the drug, but reached the normal about four days later. The drop, however, was steady and continuous.

With cow No. 30, temperature reaction began on the evening of the second day after inoculation. Parasites appeared on the seventh day, and trypanblue was injected two days after they were first seen. Marked symptoms had been existing for two days previously. In this case the parasites did not disappear at once, but were seen on the following day, but not afterwards.

There was, however, a manifest improvement in the animal's condition on the day following the injection. Here, again, there was apparently no immediate effect upon the temperature, which remained

about the same until three days after injection (the thirteenth after inoculation), when it suddenly dropped to normal and remained so.

In cow No. 32 also, the temperature reaction began on the second day after inoculation, but parasites were not seen until the seventh day. The animal did not commence to look very ill until the same day. Trypanblue was injected on the ninth day, two days later. In this case, contrary to the two preceding ones, the drug apparently had no influence whatever upon the parasites the following day, although, perhaps, such might have been seen had the animal survived long enough.

There was a rapid and decided fall in the temperature on the day following the administration of the drug, but this was evidence of general collapse rather than signs of cure, the animal dying within forty-eight hours after injection of trypanblue, and on the eleventh day after inoculation.

The *post-mortem* examination showed severe enteritis and endocarditis. The two untreated (control cows) had very severe reactions, and died on the eleventh and tenth days after inoculation respectively, of acute piroplasmosis (redwater).

Conclusions.—The use of trypanblue in the foregoing cases had a decidedly beneficial action on the course of the disease in the cases treated, except No. 32, both directly in destroying the piroplasms in the circulating blood, and also in lowering the body temperature. It is very evident, however, that for the full benefit of the drug to be realized, it must be used as early as possible.

When the disease (redwater) has become fully established, even then the injection of trypanblue will no doubt exert its specific action in destroying the parasites in the circulation, but by this time other and grave changes have taken place in various organs of the body, the animal dying from the effects of the latter complications, which the drug is powerless to control.

Experiment No. 3, with Trypanblue.

The subjects of this experiment, three in number, were valuable pure-bred Devon bulls, Nos. 34, 35, and 37. They had recently been imported from England and were inoculated at the Experimental Station in order to render them immune against piroplasmosis (redwater) before exposing them to natural infection. Each animal was inoculated with blood from two different animals on two occasions, but no redwater reaction due to *Piroplasma bigeminum* resulted. They, however, all became infected with the ring and rod piroplasm.

On the third occasion they were each inoculated with 5 c.c. blood from heifer No. 18. This blood had previously been ascertained to be very virulent indeed, *vide* experiment No. 1 with trypanred. Naturally under the circumstances it was out of the question to leave one of the bulls untreated as a control. The details of the experiment are as follows:—

Bull No. 34.—Inoculated subcutaneously February 28, 1910, with 5 c.c. blood from heifer No. 18. Parasites (*P. bigeminum*) appeared on the eleventh day, but temperature reaction did not begin until twelve days after inoculation. Trypanblue was injected on the fourteenth day. (See Table X.)

There was much destruction of red corpuscles in this case with

marked poikilocytosis, polychromatophilia, and punctate basophilia, the latter changes lasting a fortnight after return of temperature to normal.

TABLE X.

Days after inoculation	Temperature		Parasites	Urine	Remarks
	° a.m.	° p.m.			
11	101·8	102·2	Scanty	—	Dull.
12	102·8	103·8	Numerous	—	Not feeding well.
13	104·2	104·8	,,	—	Ill; not feeding; mucous membranes congested.
14	106	106	Very numerous	Slightly redwater	Seriously ill; pulse weak and rapid; breathing hurried and laboured; not feeding. 1 p.m., injected subcutaneously 1 grm. trypanblue in 100 c.c. sterile water.
15	102·6	102·4	Absent	Normal	Feeding and ruminating; looking better.
16	102·2	102·2	,,	—	Still improving; mucous membranes very pale.
17	Normal		,,	—	Progressing favourably.

Recovered.

TABLE XI.

Days after inoculation	Temperature		Parasites	Urine	Remarks
	° a.m.	° p.m.			
1	101·8	102·4	Not seen	—	
2	101·8	103·8	,,	—	
3	105·4	105·8	,,	—	No signs of illness except temperature.
4	106·4	106·8	,,	—	,, ,,
5	105·8	106·4	Only one pair seen	—	,, ,,
6	104·2	103	Not seen	—	,, ,,
7-13	Normal		,,	—	,, ,,
14	102·4	104	Fairly numerous	—	Dull; not feeding well.
15	105	106·4	Very numerous indeed	Redwater severe	Not feeding; very ill; pulse very rapid and irregular. 3 p.m., 1 grm. trypanblue injected subcutaneously.
16	103	104·4	Rather scanty and degenerating	Less severe	Brighter; feeding a little; diarrhœa marked however.
17	104·2	104·2	Not seen	Normal	Not so well; jaundice marked.
18	104·2	104·8	,,	,,	
19	102	102·2	,,	—	Appetite little; rather dull.
20	Normal		,,	—	Improving.
31	101·8	102	Very scanty indeed	—	Quite well.

Bull No. 35.—Inoculated February 28, 1910, with 5 c.c. blood from heifer No. 18. A temperature rise occurred on the second day after

inoculation and lasted five days. Thence until the fourteenth day the temperature remained normal. The real reaction began on the latter day. Parasites were first seen on the fifth day and not again until the fourteenth day. Trypanblue was injected on the fifteenth day. (See Table XI.)

In this case icterus was a feature besides the hæmoglobinuria. Blood destruction was marked. On the thirty-first day after inoculation parasites were again seen, but only for one day.

Bull No. 37.—Inoculated February 28, 1910, with 5 c.c. blood from heifer No. 18. Parasites (*P. bigeminum*) were first observed on the eleventh day after inoculation, and temperature reaction began on the twelfth. Trypanblue was injected on the fourteenth day. (See Table XII.)

TABLE XII.

Days after inoculation	Temperature		Parasites	Urine	Remarks
	° a.m.	° p.m.			
10	102	102·8	Absent	—	
11	100·6	101·8	Scanty	—	
12	103	103·8	Fairly numerous	—	
13	104·4	105	,,	—	Dull; not feeding well.
14	106	107·8	Very numerous	Redwater severe	Very ill; pulse rapid, weak and thready; not feeding. Mucous membranes congested. 1 p.m., injected 1 grm. trypanblue subcutaneously.
15	104·4	105	Absent	,,	Pulse stronger; mucous membrane blanched.
16	103·8	104·6	,,	Redwater much less	Not feeding well, but brighter.
17	103·2	103	,,	Urine clear	Still improving; feeding better.
18	102·6	103	,,	,,	
19	102·4	102	,,	,,	Feeding and looking well.
20	Normal		,,	,,	Recovered.

Blood lesions, viz., poikilocytosis, polychromatophilia, and punctate basophilia became evident on the sixteenth day after inoculation, and increased in severity until the twentieth day. They then gradually decreased.

Summary of Experiment No. 3.

In this, three animals, viz., Nos. 34, 35, and 37, were used. As before stated, these animals were not inoculated merely for the purpose of testing the efficacy of trypanblue, but for the purpose of immunizing them preparatory to going to North Queensland, where redwater is very virulent.

No animals could be used as controls in this experiment, as they were too valuable. However, the three were very seriously ill before the drug was used, and I had grave doubts as to the recovery of two of them.

With No. 34, parasites made their appearance on the eleventh day

after inoculation, and the temperature reaction began on the evening of the twelfth day. It was intended to adopt ordinary treatment should any of these bulls become ill, but in this case the symptoms became so urgent and grave on the fourteenth day that it was decided to inject trypanblue. This was done at 1 p.m. The result was very gratifying. On the following day the temperature had fallen to normal, the parasites had disappeared, and the animal was already looking better. Recovery was uninterrupted.

Bull No. 35.—Temperature reaction, irregular in this case, set in on the evening of the second day after inoculation, but fell to normal on the seventh day, only one parasite being seen during that time. On the eleventh day the temperature began to rise again, parasites appearing at the same time. The animal became suddenly and seriously ill, parasites being numerous, with the result that trypanblue was injected at 3 p.m. on the fifteenth day. The result, although not so rapid as in bull No. 34, was very evident. On the following day the parasites were scantily present, and on the day after that (the seventeenth) they had quite disappeared. They reappeared on the thirty-first day after inoculation, but there was no apparent effect upon the animal's health.

In this case also there was a rapid and marked reduction in temperature following the injection of the drug, but it rose again soon after, and did not fall to normal until the nineteenth day. There was, however, steady improvement in the animal's health from the day following the injection.

Bull No. 37.—Temperature reaction began on the twelfth day, and parasites were first seen on the eleventh day after inoculation. On the fourteenth day the animal became dangerously ill, parasites being very numerous. Trypanblue was therefore injected at 1 p.m. the same day. On this occasion also the result following the use of the drug was very marked. Parasites had quite disappeared on the following day, and the temperature had dropped from 107·8° to 104·2° F. On the nineteenth day (five days after the injection) it had reached normal, the fall being steady and continuous.

Improvement in health was not seen so rapidly as in the other cases, no doubt because the animal had the most severe attack, but two days after the use of the drug he looked brighter, and commenced to feed on the third day. Recovery was then steady and uninterrupted.

Conclusions.—The use of trypanblue in these cases had a decidedly rapid and beneficial effect, improvement taking place very soon after its administration. Temperature was rapidly lowered, and the parasites in the peripheral circulation destroyed. It therefore follows, one may reasonably conclude, that the use of trypanblue is likely to be followed with good results when the drug is injected as soon as the disease becomes manifest.

Experiment No. 4.

In this experiment seven adult cows were used, Nos. 38 to 44 inclusive. They were obtained from the Darling Downs, which is quite free from ticks, and were said never to have been in tick-infested country.

On February 24, 1910, each cow was inoculated subcutaneously with 50 c.c. citrated blood from heifer No. 18. This blood was very virulent, as will be seen from experiments Nos. 1 and 3.

Cow No. 38.—Parasites appeared on the eighth day. There was a slight temperature reaction, but not severe enough to warrant the use of trypanblue. The animal made a good recovery.

Cow No. 39.—Temperature reaction began on the eighth day after inoculation, parasites appearing on the same day. For several days the animal was fairly ill, but here again the case was not considered a good one for the administration of trypanblue. The cow made an uneventful recovery.

Cow No. 40.—Parasites appeared on the eighth day after inoculation. The animal showed very little indisposition as the result of the inoculation, and there was very little temperature reaction. Trypanblue was therefore not used. A good recovery was made.

Cow No. 41.—Parasites appeared on the eighth day after inoculation. As with No. 40, there was no temperature reaction, and very slight indisposition. Trypanblue was not used. A good recovery was made.

Cow No. 42.—In this case there was a distinct temperature reaction, commencing on the sixth day after inoculation. Parasites were first seen on the seventh day. The animal became ill, but as the appearances showed that the case would not be a severe one, trypanblue was not used. A good recovery was made.

Cow No. 43.—Parasites appeared on the ninth day after inoculation, but temperature reaction did not set in until the fifteenth day. For a few days after this the animal became ill, but here again not sufficiently so to justify the use of trypanblue in an experiment of this nature. The animal recovered without its aid.

Cow No. 44.—Parasites first appeared on the eighth day. Temperature reaction was not very marked, and the cow did not appear very ill. Trypanblue was not used. The animal made a good recovery.

Experiment No. 5.

In this experiment eight adult cows, Nos. 46 to 53 inclusive, were used. As with the cows in the previous experiment they were obtained from the Darling Downs. In this case, however, as there were good grounds for believing that the previously obtained cows had some degree of acquired immunity, the stock inspector who made the purchase was asked to take extra precautions in making certain that this last batch of cows had never in their life been in tick-infested country.

On March 24, 1910, each cow was inoculated with 50 c.c. citrated blood from heifer No. 18. The reactions which followed were so slight that they were each reinoculated on April 6, with 50 c.c. blood from steer "S," an animal whose blood was known to be very virulent. Again the ensuing reaction was unsatisfactory, and on April 18 each animal was inoculated a third time, on this occasion with 50 c.c. blood from steer "D," also an animal whose blood was known to be virulent. The reaction on this occasion was quite negative.

In all these eight cases the reactions were of such a character that, considering the object of the experiments was to ascertain what curative effect trypanblue had upon cases of piroplasmosis (redwater), the use of the drug was not considered justified. It was therefore

not used in any of the above eight cases. All the animals made a complete, unaided recovery; no treatment of any herd being adopted.

Cow No. 46.—Temperature reaction began on the thirteenth day after inoculation. Parasites appeared on the nineteenth day; illness was not very marked. Recovery complete.

Cow No. 47.—Temperature reaction began on the eleventh day after inoculation. Parasites appeared on the fifteenth day. The cow appeared ill for several days, but a good recovery was made.

Cow No. 48.—Parasites were seen on the eleventh day after inoculation, and temperature reaction began on the same day. Illness was fairly severe, but under the circumstances, as before stated, not sufficiently to justify the use of trypanblue. An uneventful recovery was made.

Cow No. 49.—Temperature reaction began on the twelfth day, and parasites appeared on the thirteenth day after inoculation. Illness was slight, and recovery soon took place.

Cow No. 50.—Temperature reaction began on the ninth day after inoculation. Parasites (*P. bigeminum*) could not be seen at any time, but the other species of piroplasm (viz., rings and rods) first made their appearance on the ninth day. There were little visible signs of illness.

Cow No. 51.—Parasites appeared on the eleventh day, and temperature reaction began on the thirteenth day after inoculation. Illness was fairly marked, but trypanblue was not used. A complete recovery was made.

Cow No. 52.—Temperature reaction began on the ninth day, and parasites were first seen on the thirteenth day after inoculation. In this case the illness was severe, but as it had been chosen as a control the animal was not treated with the drug, recovering completely without its aid.

Cow No. 53.—Temperature reaction began on the twelfth day. The only day on which parasites were found was the sixteenth after inoculation. Illness was not very marked, and recovery rapid and complete.

Summary of Experiments, Nos. 4 *and* 5.

For convenience these two separate experiments are considered here together. In the first, seven adult presumedly susceptible cows were used, and in the second, eight adult presumedly susceptible cows.

In experiment No. 4 the seven cows were inoculated once, each having 50 c.c. blood from heifer No. 18. This blood had been proved on various occasions to be highly virulent (also *vide* experiments Nos. 1 and 3). All of the animals reacted, parasites appearing in the blood in the usual course, and the clinical symptoms were more or less evident. Although in several instances the reaction was fairly severe, all of the animals recovered without the aid of any treatment whatever.

In experiment No. 5 the eight cows were each first inoculated with 50 c.c. blood from heifer No. 18. Thirteen days after they were each reinoculated with 50 c.c. blood from another animal whose blood was known to be virulent. Twelve days after the second

inoculation they were injected a third time with 50 c.c. virulent blood from a third animal. In this experiment, as with the preceding, the result from the point in view was unsatisfactory. All of the animals reacted it is true, and in the blood of all except one, viz., No. 50, parasites (*P. bigeminum*) could be found, but, considering the object of the experiments, the illness resulting, although in some cases fairly severe, was not considered of such a nature as would justify the use of the drug trypanblue. All of the animals made a good rerovery without its aid.

Conclusions.—Although the two experiments just cited have no direct bearing upon the question as to the efficacy of the drug trypanblue, it has an indirect bearing of some importance, as they illustrate the remarks made at the commencement of this report, that were the drug used indiscriminately upon all experimental cases like these, the conclusions likely to be drawn would be apt to be erroneous. For in these cases just quoted, had the drug been used even only upon those animals which were manifestly ill and showing parasites in their blood, the cure would have been credited to trypanblue, whereas it is seen that all fifteen animals recovered without it. The experiments show the great necessity for care in drawing conclusions from a few experimental cases.

I have not attempted to go into the reasons why fifteen adult cows brought from a tick-free area should all fail to become severely infected when blood of such high virulency was used, as a discussion on this subject would open up too many side issues, apart from the cure of redwater to which this article is confined.

General Conclusions.

Trypanblue in cases of redwater or tick fever (piroplasmosis) has been shown in the main to be an efficient remedy. The most favourable results following its use, however, are seen when it is injected at an early stage of the disease. It may also be used with the anticipation of good results following when the fever is at its height, but if the disease has been in existence several days, not counting the period of inoculation—that is, the animal has been actually ill for some days—favourable results must not be looked forward to with too much confidence, for although, even in these cases, the drug exerts an undoubted effect upon the parasite, complications may have already set it, and when such is the case it is the latter which may ultimately cause the death of the animal. Although the results following the use of the drug in experimental cases have been very satisfactory, yet definite conclusions can only be drawn after the drug has been used for some time in the field on a large scale and over a large area. The conditions under which experiments of this kind are performed in a laboratory are to a great extent, and of a necessity, somewhat artificial, although such preliminary experimental work is essential. What one desires is that the same results as obtained by experiment shall follow when natural conditions obtain, the latter being the final test.

The Use of Drug Treatment in Practice.

The answer to the question as to what benefit the successful treatment of redwater will be to stock-owners in Queensland depends upon what aspect the matter is viewed from.

With the large cattle stations extending over hundreds of miles, and also even upon some of the smaller grazing farms, curative treatment is not practicable, for the cattle wander over large areas, and even if the owner wished, he would seldom see the animals early enought for curative treatment to be of any use. The means best suited for such conditions are preventive ones—either the eradication of the tick or preventive inoculation, the latter measure apparently finding most favour with the station owner at present.

It is with the dairy farmer and the owner of a few head of cattle that the curative treatment is likely to be of greatest practical benefit, and also with the station owner with regard to his stud bulls. The loss experienced when valuable susceptible bulls are introduced to infected country is sometimes heavy. As such animals are watched pretty closely, the possibility of a cure being at hand would be of great practical benefit, for the drug could be used without delay.

Concerning the dairy farmer, the problem here is not altogether a simple one, for on the larger farms the dry cows are turned out and only seen at irregular intervals. On the smaller farms, of course, the question is simpler.

However, generally speaking, on all of the dairy farms the milking cows are seen daily, and the owner can generally tell when an attack of fever is setting in, even if the animal is not actually passing redwater. These are the cases where treatment is very practicable and likely to be of the greatest benefit, and, considering the large number of dairy cattle lost annually in Queensland through tick fever or redwater, the farmers concerned should certainly be persuaded to adopt the use of trypanblue as a cure, especially those who are opposed to the practice of preventive inoculation.

Since writing the foregoing article I have had occasion to use trypanblue upon a number of naturally occurring cases of redwater on dairy farms in the neighbourhood of Brisbane, the cases being of a very severe type and the previous mortality heavy.

The results following the use of the drug in practice have so far borne out what was observed experimentally. Without going into details here, one may briefly say that, providing the disease has not been in progress too long, one has every reason to anticipate a favourable result following the administration of trypanblue; but where complications have set in, which often happens here if the disease has taken a long course, one must not place too much reliance upon the efficacy of trypanblue, but also treat the complications as th arise.

Indexed B. A. I.

Clinical Articles.

BACELLI'S TREATMENT OF TETANUS BY HYPODERMIC INJECTIONS OF A SOLUTION OF CARBOLIC ACID.

By Lieutenant-Colonel J. MOORE.
Deputy Principal Veterinary Officer in India.

In Winslow's "Veterinary Materia Medica and Therapeutics," fifth edition, it is recorded that "Bacelli's treatment of tetanus has met with remarkable (fourth edition says considerable) success of late. One drachm of the pure acid in solution (5 to 10 per cent.) should be injected in the region of the neck and shoulders of the horse every two hours during the first thirty-two hours, and less frequently afterwards. As much as 36 dr. may be given to the horse in twenty-four hours, for there appears to be a special tolerance for carbolic acid acquired in tetanus."

Instructions were given to veterinary officers serving in India to try Bacelli's treatment, and the following communications may be of interest to readers of your Journal:—

(*Communicated by Lieutenant H. C. Stewart, A.V.C., Station Veterinary Hospital, Nowshera.*)

A horse belonging to the 35th Scinde Horse, Peshawar, was admitted to the 21st Cavalry Veterinary Hospital, Nowshera Cavalry Cantonment, on September 19, and was treated as follows:—

A purgative was first given, and after twenty-four hours pure carbolic acid, 1 dr. in solution, was injected into the region of the neck and shoulders every two hours for thirty-two hours; then every four hours for three days, and afterwards every eight hours. This treatment was continued until the 26th inst., on which date I inspected the horse. He was then in a very serious condition, showing the worst symptoms of the disease, the stiff or "stag-like" appearance of the extremities, and nearly jumping out of the box on the slightest movement of anyone in the vicinity. No length of time being stated for this treatment, and the horse apparently becoming worse, I decided to try a change of treatment for two or three days, and alternate it with the carbolic acid method. Consequently 1 dr. ext. belladonna virid. in treacle was administered twice daily with quinine. Under this treatment the animal at once started to improve, and it was therefore continued until October 10. It had now practically recovered,

and tonic powders containing pulv. nux. vom. 1 dr., pulv. gentian 2 dr., pulv. zingib. ½ oz., were given daily. The horse was discharged as cured on October 15, having apparently quite recovered.

Will you please ascertain how long Bacelli's treatment should be continued, as if there is no danger of carbolic acid poisoning I propose next time to continue the treatment until the case is cured, or dies. Under the circumstances, I cannot say if the carbolic acid or belladonna effected the cure, but am inclined to think that both these drugs had a share in it, the carbolic acid tiding it over the worst stages of the disease.

(*Communicated by Lieutenant R. W. Mellard, A.V.C., Station Veterinary Hospital, Mhow.*)

On December 23, 1909, a bay Australian mare, "D" 2nd Inniskilling Dragoons, aged 11, an officer's charger, was admitted to hospital with wound contused (broken knees), both fore. The accident was a severe one, extending down to the tendon sheath. The mare was detained in hospital, the wounds healing very slowly. On the morning of February 2, when going round the hospital, I observed the mare's tail erected, which looked very suspicious of tetanus. I had the mare taken outside, and on examination there was no doubt the case was one of tetanus.

Symptoms.—The jaws were fixed, protrusion of the nose, contraction of the muscles of the neck, ribs, and along the back; when the head was elevated the membrana nictitans passed over the eye; on the slightest noise there were tetanic convulsions.

Treatment.—The animal was isolated in a shed, which was closed in and kept in semi-darkness. An aloetic ball was given at once.

Diet.—Lucerne and very sloppy bran mashes.

Bacelli's Treatment.—First day, every two hours the following injections were given hypodermically: Ac. carbol. 1 dr., aq. dist. 10 dr.

Second day, same injection every three hours.

Third day, same injection every four hours.

Fourth day, no injection given.

Fifth day, seven injections given every third hour.

In all the animal had 3 oz. 7 dr. I stopped the injection, as I found the insertion of the needle into the skin caused the animal to have violent convulsions. Even touching the skin caused great pain, but as soon as a few drops of the concentrated carbolic solution was injected, it acting as a local anæsthetic, the animal did not mind further handling over the seat of inoculation. Combined with Bacelli's

treatment, large doses of chloral hydrate 1½ oz. were given *per rectum* daily for four days. Also pot. bromide ½ oz. was given on the fifth day, and continued for ten days. Since then no medicine has been given; the animal is still isolated, and is improving slowly. She has now been under treatment twenty-six days.

(Communicated by Colonel F. W. Forsdyke, A.V.S., S.V.O., Second (Rawal Pindi) Division.)

Bacelli's treatment of tetanus with carbolic acid has been tried at Rawal Pindi and Campbellpore, and to date with little success.

Case 1.—The first case was Horse No. 49, 13th Battery, R.F.A., admitted to hospital at noon, showing marked symptoms of tetanus, probably due to wound infection, a nearly healed wound existing on the abdomen. Bacelli's treatment was commenced, 1 dr. of a 10 per cent. solution of pure carbolic acid being injected in the region of the neck and shoulders every two hours on that day. The condition of horse showed no change. Thin gruel was administered and swallowed with difficulty.

Second day, the injections were continued up to 8.30 p.m. Condition remained unchanged.

Third day, at 12·30 a.m. another injection was given and repeated every four hours until 8.30 a.m., then every two hours until 8.30 p.m. Result: distress and excitement shown.

Fourth day, at 12.30 a.m. injections were given every four hours until 8.30 a.m., and every two hours until 6 p.m., when the patient became worse, showing signs of approaching death. Died at 9 p.m.

Case 2.—A private charger, admitted to hospital late at night, and received a dose at once of anti-tetanic serum. The next morning was found to be doing well, and attempting to eat. At 9 a.m. Bacelli's treatment was commenced and carried on until 5 p.m., when the tetanic spasms became so severe that the animal could not be approached without danger of its falling. He had received up to this time five doses of pure carbolic acid in 7½ per cent. solution. On the following morning the case was considered hopeless, and destruction followed. The veterinary officer in charge records his opinion that "had it not been for Bacelli's treatment he might have recovered."

I am of opinion neither of these cases can be considered conclusive, and am seeking further trials and reports.

ACUTE RHEUMATISM TREATED WITH ASPIRIN INTERNALLY AND ANTIPHLOGISTINE EXTERNALLY.

By MAXWELL EDGAR, M.R.C.V.S.
Wanganui, New Zealand.

The three-year-old thoroughbred colt Polymorpheus in training became suddenly lame on the near foreleg while at walking exercise. This lameness was so severe the lad dismounted, and had some difficulty in reaching the stable. This severe condition soon passed away, but the colt remained sore, the lameness appearing and disappearing in one or more limbs. I was called in four days after the first appearance of the trouble. There was a hot, painful swelling of the near fore fetlock, the near hock was swollen and œdematous, and the temperature 102° F. On the colt being trotted out his action was stiff and cramped, with a slight lameness of the near fore.

Diagnosis.—Acute rheumatism.

Treatment.—He was prepared for physic, and 6 drm. aloes administered. Aspirin 2 drm. was given three times daily in laxative food, and the swollen joints poulticed with antiphlogistine and bandaged with flannel.

The colt recovered within a week and returned to work, and has since won several important races. There has been no recurrence of the trouble since recovery some months ago.

ABORTION IN A MARE, FOLLOWED BY EVERSION OF UTERUS, AND SEPSIS.

By MAXWELL EDGAR, M.R.C.V.S.

A Clydesdade mare, about nine months pregnant, showed signs of abortion. I was called in during the morning on the first appearance of the pains, and founds the forelegs presenting and the head turned towards the left shoulder.

An attempt was made to reduce the head, but the womb violently resisted any interference. Delivery was, however, accomplished with little difficulty by moderate traction. The membranes were entangled in the hind quarters of the fœtus, and delivery being more rapid than anticipated, followed the foal in a mass, and the womb became completely everted.

Morphia 4 gr. was at once given hypodermically. The membranes were stripped as completely as possible, and the womb returned. The

organ was kept in position for half an hour by the arm and fist of an attendant and then was douched with cold water.

I returned at 5 p.m. and found the mare much excited by morphia; no pains, and womb in position.

Next day, 10 a.m., patient dull, no pains, temperature 104° F. I douched the womb with warm water and lysol, and gave hypodermically nuclein and normal salt solution 20 c.c. (Parke, Davis and Co.) twice during the day.

Next morning at 10 a.m. mare brighter and feeding; temperature, 102° F. The discharge from the womb had an evil smell, so I examined womb but failed to find any remains of placenta. Douched again with weak solution of lysol and warm water, and gave instructions to repeat every four hours. Repeated nuclein and salt solution injection.

On returning next morning owner informed me that a small place of placenta came away with the evening douch. Mare quite well, temperature normal, with no stiffness or symptom of lameness.

Nuclein appears in this case to have had some influence over sepsis and reduction of the temperature. I shall give it a further trial.

FRACTURE OF THE OS SUFFRAGINIS IN A RACEHORSE.

By MAXWELL EDGAR, M.R.C.V.S.

A CHESTNUT trotting stallion while doing a preliminary trot attempted to jump a footpath leading over the racing track. He fell and in doing so fractured his near hind pastern.

Examination showed comminuted fracture of the os suffraginis. The pastern and fetlock were bandaged with strong gum plaster, and the horse walked with difficulty to a stable near the course. He was placed in slings, the gum plaster removed, the limb placed in plaster of Paris *secundum artem*. The plaster set well, and from the foot to the hock the limb was completely fixed.

He evidenced much pain for ten days, but fed well. He was taken out of slings at the end of the fifth week, much emaciated, and turned out into a small enclosure. Here he moved about freely, putting some weight on the toe of his foot, but on resting he had to be assisted to rise for about three days.

The plaster was removed at the sixth week, and a light shoe with

a 1½-in. raised bar heel placed on the foot. He now placed much weight on the foot and began to put on flesh. The heel of the shoe was lowered to ¾ in. at the seventh week, and the horse walking sound was returned to owner, with instructions to remove shoe and turn him out to pasture. There was no excessive callus and no deformity of the part, examination of the joint before his departure showing no ankylosis.

It will be interesting to know if the horse will race again.

LIPOMA IN AN AUSTRALIAN COCKATOO ASSOCIATED WITH ENLARGED FATTY LIVER.

By J. A. GILRUTH, D.V.Sc., M.R.C.V.S.

The bird, a galah (*Cacatua roseicapilla*, Vieillot), was sent to me by Mr. C. Cummins Cherry, G.M.V.C., Melbourne, with the following history: The case had been brought under Mr. Cherry's notice about six months previously. Suspecting a malignant form of growth, and knowing the danger of operating on birds, he recommended destruction. As the tumour continued to increase in size the owner ultimately agreed to the course recommended, and the animal was killed under anæsthesia. Its age could not be determined.

Situated subcutaneously on the inferior surface of the abdomen, slightly to the right of the median line, was a large oval tumour the size of a mandarin orange. Soft in consistence, it was definitely circumscribed, and was readily separated from the surrounding tissues, which were not infiltrated. On section the tissue proved homogeneous in appearance, being of a yellowish-white colour, except at the posterior border, where there were the remains of an old blood extravasation, which suggested an attempt some time previously at operation. The knife was distinctly greasy, and a scraping examined under the microscope showed the tissue to be extremely fatty in nature.

The viscera were normal, except the liver, which was greatly enlarged, pale, and mottled throughout with irregular greyish areas. On section the tissue was extremely soft and friable, while the knife-blade showed distinctly globules of fat. The other internal organs were normal.

Microscopical examination, as anticipated, showed the tumour to be composed entirely of fat cells. Sections of the liver showed congestion of capillaries, and small areas of blood extravasation. The whole of the hepatic cells were more or less infiltrated with fat, the majority being converted into typical fat cells with peripheral nuclei.

In addition, the interlobular fibrous tissue showed considerable hypertrophy, intercellular bands even penetrating many of the lobules, the great majority of which were indistinguishable as such.

While it is more than probable both the cirrhotic and the fatty states of the liver were simply due to the nature of the food and the prolonged want of exercise to which such tamed animals have to submit, the development of the lipoma subcutaneously cannot be explained on this hypothesis.

Further, the case is interesting as one in which an operation might have been performed with comparatively little of the usual great risk that attends operations on birds.

GASTRITIS DUE TO TRICHOSTRONGYLE INVASION. CASES IN ADULT CATTLE.

By J. A. GILRUTH, D.V.Sc., M.R.C.V.S.,
Professor of Veterinary Pathology,
AND
GEORGINA SWEET, D.Sc.,
Lecturer in Parasitology at the Melbourne University Veterinary School.

It must be admitted that while gastric derangement, particularly in young cattle and sheep, is frequently due to invasion of the abomasum by numbers of the striped strongyle (*Strongylus contortus*), and that such a condition is readily recognized, the fact that severe digestive disturbances, manifested by diarrhœa and progressive emaciation, may be due to the presence in the fourth stomach, either alone or in conjunction with the former, of large numbers of a very much smaller and with difficulty detected nematode is often overlooked.

During the past, in Australia, records of parasitic invasion have ignored the occurrence of the smaller parasites, partly, no doubt, because the presence of the larger has offered a satisfactory solution for the disease at the time affecting the host, but also, in part, because it has not been recognized amongst the ingesta. In New Zealand, for many years the severe effects of the presence of a small nematode, similar to that described by McFadyean as *S. cervicornis*, and by others as *S. ostertagi*, &c., has been recognized in young cattle, lambs, and even in young goats ("Annual Reports Veterinary Division Department of Agriculture, New Zealand"); but in Australia this occurrence has only recently been recorded, the first observer to do so being Mr. S. Dodd, F.R.C.V.S., in his last annual report to the Queensland Government.

The small nematodes found in the New Zealand cases have been classed among the *Trichostrongylinæ* by Professor Looss, and are probably similar to, if not identical with, those variously described by others as *S. ostertagi*, *S. cervicornis*, &c.

They are found almost confined to the fourth stomach in ruminants, and may be present in enormous numbers. In addition to moving freely amongst the ingesta, numbers are found on the surface of the mucosa, which is generally more or less inflamed, and may even be eroded. Careful examination will generally show small circular elevations, about $\frac{1}{4}$ in. to $\frac{1}{3}$ in. in diameter, each with a minute central depression, scattered throughout the mucous membrane. Sections of these elevations will show, under the microscope, one or more dilated lumina of gastric glands, in which there is lying, more or less coiled, an immature larval parasite.

When examining *post mortem* an animal in which the presence of these small parasites is suspected, we find the most satisfactory procedure is, in the first place, to open the stomach along the lesser curvature, and then, holding it steadily, watch the contents carefully. A peculiar wriggling motion of the surface of the fluid will be observed, due to the movements of the worms. They will not be detected individually, however, unless a small quantity of scraping from the mucous surface be thinly spread upon a slide or other smooth surface and examined through a lens. If such a procedure be not possible at the time, some material should be scraped from the surface and preserved in methylated spirit; later on, if this be placed in water in a shallow dish, the parasites can be readily detected. These parasites are extremely slender, and measure from $\frac{1}{3}$ in. to $\frac{1}{2}$ in. in length when fully extended. It is because of their remarkable tenuity that their detection is almost impossible while mixed with the ingesta.

While these and other parasites are often a source of great disturbance in young animals, it is rare that adults suffer from their invasion, even though they may be exposed to infection and may harbour a few isolated specimens. Recently, however, one of us found them present in large numbers in cows which presented definite symptoms of illness, although hardly those usually associated with such a condition of parasitism.

The cases in question occurred amongst cows in milk. The herd of thirty was depastured on rough, dry herbage, and, in addition, was receiving a daily ration of hay, bran, &c. All the cows were in good condition, except six which had been bought at the beginning of the summer. For some weeks prior to being seen (in February) they had

been losing condition, and the milk supply had gradually diminished. When examined the pulse was weak, but the temperature and respirations were normal. The coat was staring, the animals were listless, there was weakness and uncertainty of gait, and at times stumbling; the milk supply had practically disappeared, but there was no evidence of diarrhœa. It should be noted that the cases were considered by some farmers in the district as affected with the early stages of "bone softening" (probably osteo-malacia), a disease said not to be uncommon there, and the etiology of which has not yet been investigated, but careful examination did not confirm this opinion.

In order to facilitate an inquiry into the cause, the owner agreed to the sacrifice of the worst case. *Post-mortem* examination disclosed no abnormality beyond a congested and catarrhal condition of the abomasum mucosa, which in addition was thickly studded with small circular elevations, about a centimetre in diameter, each with a minute central depression. The fluid contents of the abomasum, when examined after the manner indicated, were seen to be greatly agitated by rapidly moving minute bodies, which were surmised to be small nematodes, as proved to be the case on ultimate microscopical examination. A small quantity of the liquid contents was preserved, and from this it has been estimated that at least a hundred parasites were present in each cubic centimetre of stomach ingesta. It was apparent that these parasites were the cause of the inflamed condition of the mucosa, which, together with the irritation produced by the larvæ within the gastric glands and the consequent interference with secretion of gastric juice, was sufficient to account for the general malaise and progressive emaciation manifested by the host. The absence of diarrhœa was doubtless due to the dry nature of the herbage and other food received. At all events, in view of its almost constant occurrence in parasitic gastritis elswhere, its absence can with difficulty be accounted for otherwise.

Treatment of the remainder of the sick animals with lysol and tonics internally resulted in a gradual return to a normal condition.

The characters of these nematodes have been carefully studied and the following conclusion reached:—

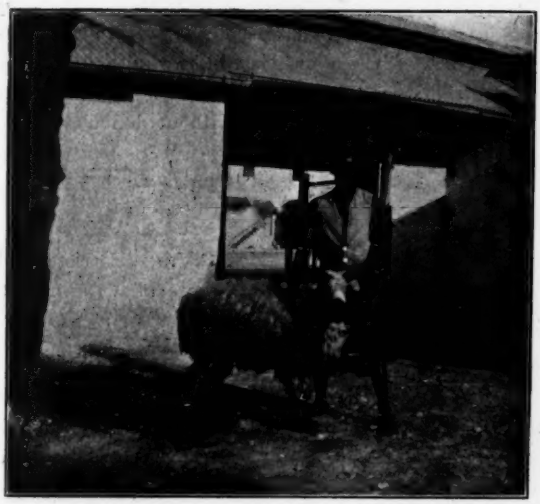
The parasites are strongyles with a simple mouth, having a bursa supported by true rays in the male, in which also there are two spicules. In the female the vagina is short and the uteri divergent, the musculature being comparatively well developed. They therefore are members of the sub-family *Trichostrongylinæ* separated out by Dr. Leiper ("Third Report, Wellcome Research Laboratories, Khartoum,

1908," p. 190), and of the five genera with their species included by him in that sub-family. These specimens appear to be most similar to *Ostertagia ostertagi* (Stiles, 1892), which are characteristically found in the abomasum of cattle under similar conditions to these. Compared with *O. ostertagi*, these, however, are several millimetres shorter, but equally thick worms, both in male and female, the tail is shorter and the cutaneous fold in the female and the bursa in the male are distinctly smaller, even in fully matured specimens. But as the specific distinctions between many of these strongyles of the alimentary canal of ruminants appear much confused, we do not feel justified in identifying these specimens, or in describing them as a new species, without further work in comparison of specimens and literature as these become available.

A FOUR-HORNED MUSCAT RAM.

By J. A. N. DA CUNHA, G.B.V.C.
Veterinary Surgeon, Zanzibar.

By permission of Dr. L. A. Andrade, the Master of the Horse to H.H. the Sultan of Zanzibar, I send you a photograph of a Muscat



ram, to be reproduced if you think it will prove interesting to the readers of the Veterinary Journal.

It is really a curious four-horned fat tail ram, aged 5, presented by

the Chief of Oman to the Sultan of Zanzibar in 1909, and now shares quarters with companions in the Sultan's live stock farm. Sheep with this peculiarity have not been unknown, but they are exceedingly rare.

AN INFLAMMABLE COLIC DRAUGHT.

By WILLIAM BEDDARD, M.R.C.V.S.
Wolverhampton.

About 7 p.m. on March 11 last a black van mare was brought into the infirmary suffering from acute colic. I personally administered a draught consisting of spt. ether. nit. ʒss., ol. tereb. ʒii.ss., ol. lini ad. ʒviii., ft. mistura.

Just as she was taking the last mouthful the mare plunged forward and landed with her mouth open on a lighted gas bracket, with the result that the contents of her mouth caught fire and a flame issued from the front and corners of the lips for fully two minutes before one of my men extinguished it with his cap. The mouth was badly burned and the lower lip has since retracted to such an extent, owing to the cicatrices, that it is useless as a prehensile organ. The mucous membrane at the corners of the mouth is still raw, although it appears to be healing, and the mare has learned to use her teeth and upper lip sufficiently expertly to be able to eat without difficulty.

Mr. W. Freeman Barrett, M.R.C.V.S., Barrister-at-law, has been elected President of the Royal College of Veterinary Surgeons for the year 1910-11.

The King has been pleased to grant the distinction of companion of the most distinguished Order of St. Michael and St. George to Mr. John Gunion Rutherford, Veterinary Director General and Live Stock Commissioner, Department of Agriculture, Canada.

Canine and Feline Clinical Notes.

A CASE OF IRREDUCIBLE INTUSSUSCEPTION IN THE DOG—ENTERECTOMY—RECOVERY.

By H. A. WOODRUFF, M.R.C.V.S.

Professor in the Royal Veterinary College, London.

This case was seen by the writer on April 2 in consultation with Mr. A. A. Comerford, M.R.C.V.S., who has supplied the history and an account of the symptoms of the patient up to that date.

Subject.—A black and white ticked Cocker spaniel bitch, aged 6. She was always previously in excellent health, and had her first litter of puppies last October, whelping without difficulty.

She was first treated in December last for worms, and subsequently the first week in February. She was shown at Cruft's on February 9 to 11, where she won prizes.

On the Monday of the following week she was brought with the history that she was passing blood per rectum: otherwise she was apparently quite healthy. There were no signs of vomiting and no heat or pain about the abdomen. She was also feeding. I prescribed castor oil and followed with tr. chlorof. et morphin. Co. This did not have the desired effect, so I tried her on bismuth subnit. and salol āā 5 gr. t.i.d. On the third day of this treatment the fæces were normal in appearance. The bitch was discharged on the 21st, as there was no recurrence. She was, however, returned on February 28, with identical symptoms. The same treatment (ol. ricini and afterwards bismuth and salol) was adopted with again apparent success, and the bitch was again discharged on March 1.

The bitch was again admitted on March 10, and the same treatment adopted, but without success. She was now off her feed, refusing anything solid, but at times enjoyed solid food. Tinct. opii ℥x., P. creta prep. gr. v. was next tried, but with no prolonged success.

On March 27 (Easter Sunday) palpation revealed an intestinal obstruction extending back from the ribs on the right side to just within the rectum.

Operation.—A hasty examination of the abdomen and rectal exploration confirmed the physical signs described, the most peculiar feature being that at one moment a long cylindrical swelling—6 to 8 in.—could be felt, whilst at another only a hard nodule as large as an hen's egg could be found.

Chloroform was given and the abdomen opened, and the peculiar

symptoms were at once explained. An 8-in.-long intussusception of the large intestine was found and quite easily reduced, for no adhesions had formed. On reduction, however, it was found that there was a second intussusception—the original and permanent one—of the whole of the cæcum into the colon. This was the hard lump constantly found, and when straining occurred it was propelled bodily down into the colon. The cæcal telescoping was quite irreducible and the question at once arose, What line of action to adopt?

It was decided to amputate the piece of bowel involved, consisting of a short piece of small intestine, the cæcum, and a short piece of colon—in all, about 8 in. of intestine—and, not having a Murphy's button, the following procedure was adopted: The vessels of the mesentery attached to this length of bowel were ligatured with fine silk, and then the large bowel was ringed around by an incision through its serous and muscular coats, but leaving the mucous lining intact. The serous and muscular layer was split down one side for about ¼ in., and then reflected from the mucous layer for this distance, which was then cut through. Thus a tube of large intestine was left, of which ¼ in. was denuded of mucous membrane and had a raw internal surface and a split down one side ¼ in. long. Into this tube the small intestine was inserted for a little more than ¼ in. and the large tube stitched round the smaller by means of an ordinary sewing needle and fine silk. Care was taken to prevent any leakage from either cut end.

The abdomen was closed in the ordinary way.

After Treatment.—No solids were given for a week—only milk. After that ordinary soft diet for another week. Fæces were passed on the third day.

The following note by Mr. Comerford supplies the further course of the case:—

The bitch is still going on splendidly, is very lively, feeds well, and passes her fæces quite normally. The wound has healed and there is no tenderness about the abdomen.

AN INTERESTING CASE OF RHEUMATISM WITH COMPLICATIONS.

By ARTHUR PAYNE, F.R.C.V.S.

Weybridge.

On January 22 I was called to a Great Dane, aged 4, whose tail was badly bruised and ulcerated, through continually banging it against the sides of his kennel, &c.

I found about one inch of the extremity in a partly necrotic and ulcerative condition, where the blood had been escaping copiously on and off for weeks. It was thickened, bruised, and sore for a distance of about 3 in. above this.

I advised amputation of this diseased portion without further delay, but the owner would not decide until Monday morning, the 24th, when I received a message asking me to operate at once.

The patient was brought to the hospital, the operation completed, and tail bandaged with liq. ferri perchlor. I was informed that the dog had shown signs of ill-health the last few days by a difficulty in rising and disinclination for food, and general mopiness. I did not prescribe for the dog, but said I would call the following morning.

The next day the patient was very lame in his left hind leg; in fact, the limb was carried and the dog apparently suffered a good deal of pain. On making an examination I found a slight swelling on the front of the metatarsus, and on pressing this pain was evinced by the animal suddenly snapping round at me.

I ascribed the lameness and general indisposition to some rheumatic affection, and prescribed acetyl salicylic acid gr. x. three times daily. The temperature had suddenly fallen during the night and the patient had been fixed in the centre of a big building to prevent bruising of the tail.

There was no appreciable change the following day, except, if any, a slight improvement. Early the next morning he was found dead.

Post mortem.—Body well nourished; two infarctions in the spleen: a livid patch in the epicardium at the heart's apex and another in right auricle. Lightly attached and sprouting from the mitral valves was a pinkish granular mass. The endocardium was thickened and cloudy. Lungs almost hepatized, œdematous, and of a bluish-red colour.

In regard to the cause of the endocarditis, I have wondered if it could have been due to invasion of the dog's body by micro-organisms through the bruised tail, these being taken up by the blood, and arrested in the mitral valves. The infarctions and lameness were, I imagine, caused by pieces of vegetation becoming detached and arrested in blood-vessels. It is possible, of course, that these lesions were complications of acute rheumatism, but it is not common to get an attack of such severity as to cause death in so young a dog.

ABSCESS IN CAT DUE TO *BAC. PYOCYANEUS.*

By J. A. GILRUTH, D.V.Sc., M.R.C.V.S.

The case was one seen by Mr. W. Margrave Lerew, G.M.V.C., Hamilton, Victoria, who writes as follows:—

"The subject was a ten-year-old cat exhibiting a tumour about the size of a large cherry-plum on the back of the neck. The tumour was circumscribed and appeared cystic, with semi-fluid contents. The owner informed me that it had been opened twice and syringed out with pure lysol, but that after each operation it gradually refilled. I completely removed the tumour and found it to be cystic in nature, with purulent contents. The wall was dense and fibrous, unless where it was in contact with the skin, which was denuded of hair. The animal was otherwise healthy."

Mr. Lerew forwarded a small quantity of the contents of the cyst for examination. Microscopical examination of this material showed a few diplococci and many short bacilli, a large number of which were contained within the pus cells. Culture media inoculated developed numerous colonies of a bacillus which proved to be characteristic of the *B. pyocyaneus*, in addition to a few colonies of *Staphylococcus aureus*.

Abstract.

ANTISEPSIS IN VETERINARY SURGERY BY MEANS OF TINCTURE OF IODINE.

By M. R. BISSAGE.

The old proverb which says that "medicines have their fashion, like hats," is still true. The use of tincture of iodine as a disinfectant of urgency to the skin and wounds is not, however, a new mode. I have used it advantageously for twenty-five years for my patients and myself in little professional accidents, without having any claim to be an innovator.

Recent publications in the medical journals give to this use of iodine an aftermath of actuality; it will be perhaps interesting to study summarily the broad lines for the employment of this old therapeutic agent of undeniable utility in our medicine, and which can render great service in daily practice.

Authorized works have shown for some years that painting the skin with tincture of iodine causes almost as complete and lasting an asepsis of the skin as the usual procedure by brushing, soaping, and antiseptic washing. If such a cleansing followed by a rinsing with

alcohol suffices for surface disinfection, the asepsis of the skin is ephemeral and insufficient in depth.

With tincture of iodine, thanks to its power of penetration, the iodine infiltrates into the skin and disinfects the excretory glandular canals and intercellulary spaces.

Washing causes the epithelial cells to swell, obstructing the spaces and canals, hindering the penetration of the iodine. In veterinary practice one ought, therefore, to be content in small interventions such as opening an abscess, neurotomy, thoracentesis, puncture of the cæcum, &c., with wiping the skin dry with a tampon of wadding and painting it with tincture of iodine. In cases where the skin is too dirty, it should be washed with alcohol or ether followed by drying before the application. As an urgency dressing for large jagged wounds, broken knees, wounds from shafts or harrows, it is preferable to abstain from all washing, which draws pathogenic germs into the wound. One should simply remove the greatest soiling with a pad of wadding, and paint all the broken surfaces and neighbourhood of the wound with tincture of iodine.

Without contra-indications in veterinary practice save, perhaps, for the eyes and ears, one should employ the tincture with the addition of water and pot. iodide; this process of disinfection has multiple applications in daily practice by reason of the rapidity and ease with which it can be executed. It is above all indicated in the country in surgical urgency, where time and means fail for procuring a serious cleansing of the skin, of a bad wound, or of the field of operation, for an intervention that cannot wait. This method is valuable in animals where the skin is thick, provided with voluminous glands, often dirty and deeply infected.

The operatory manipulations are more simple, shaving of the dry skin, or even cutting the hair with the shears or scissors, cleaning with wadding, then wide painting of the region with a tampon soaked with tincture of iodine fixed to a piece of stick or held in forceps; wait for a moment for the evaporation of the alcohol. If the skin is very fine, one can remove the excess of iodine with wadding or by rinsing in alcohol. After suturing, put a little of the liquid on the points.

In veterinary practice one can employ, especially for the horse, the officinal tincture of iodine up to one-tenth; in blood horses one should add alcohol to reduce the tincture to a lower strength. It is necessary only to employ a liquid well preserved in a coloured flask stopped with emery to avoid too great a causticity.

In 1906, Hensner proposed using iodized benzene, 1 in 1,000, for disinfection of the skin, on account of its solvent power for fatty bodies; this practice has not taken on, the benzene being more irritant than alcohol.

In the dog and certain irritable horses, one can use iodized chloroform advantageously, recommended by Professor Chassevant (1 gm. of iodine to 20 gm. of chloroform), which has the same properties as tincture of iodine, and which provokes neither pain nor desquamation, and preserves the skin supple and intact.

It would be interesting to try the use of iodized vasogen, whose great power of penetration is used considerably in veterinary practice.

Tincture of iodine is also indicated in urgency cases in burns, wounds always easily infected. A rapid cleaning to remove soiling, and

to dry, and wide and deep painting over the denuded zone will suffice.

The employment of tincture of iodine is valuable as a prophylactic in our medicine where professional inoculations are frequent with the operator, existing wounds before inoculation, and which present some danger, may be touched with tincture of iodine. Excoriations, wounds arising in the course of an operation in a septic media benefit largely from this procedure, which I have used for a long time for myself with advantage. Disinfection of the hands of the operator before a big operation may be easily and usefully made by plunging the hands, in case of need, in tincture of iodine, which can easily be removed, the operation terminated by washing in ammoniacal water.

This procedure is recommended in operating for hernia and cryptorchids. We have used with success, L. Naudin and myself, for several years, painting with tincture of iodine the region operated on in point and line firing immediately after operation, before letting the horse up; one asepticises thus for several days the wounds of the points and the lines, and thus avoids pruritus, synovitis, and sloughing.

We have only praise for this procedure, both in fine and coarse-bred horses. As a *résumé*, painting with tincture of iodine effects a sufficient asepsis of a certain duration, and is an easy and little troublesome application. This procedure seems to have actually acquired an important place in urgent surgery, which is just as well for practitioners to keep in memory.

(*Revue Générale de Médecine Vétérinaire.*)

JUBILEE OF PROFESSOR WILLIAM SCHÜTZ, M.D. & D.V.M., BERLIN.

On April 16, 1910, Professor Dr. William Schütz completed fifty years of work as a veterinary surgeon. He was born on September 15, 1839, in Berlin.

He gained his diploma at the Veterinary School in Berlin, on April 16, 1860. Afterwards he studied human medicine at the Berlin University. He then took up a position as district veterinary surgeon at Fischhausen, and in 1866 took service in the field at Trantenau and Königgrätz. On April 16, 1867, he returned to Fischhausen after the war, and was appointed departmental veterinary surgeon, and in October 1 he was promoted to the position of lecturer on special pathology and therapeutics at the Veterinary School. Notwithstanding the duties of his official position, he gave some of his time to scientific work, and contributed articles to the professional magazines on such subjects as "Pyæmia," "Epidermoidal Cancroid," and "The History of the Growth of the Tumour Albus." On May 4, 1868, he received the degree of M.D. of Berlin University for his work "On the Peat Hog." A year later he wrote a pathologic-anatomical article in *Virchow's Archives* on "Rickets in the Dog."

For the next ten years Schütz taught pathological anatomy and contributed articles to the journals on "The Knowledge of Dignathia,"

"Nephritis Lymphosarcomatosa (tuberculosa) of the Cow," "The Genuine Inflammation of the Lungs of Horses," "Influenza Erysipelatosa" (contagious erysipelas of the horse).

The influence of Schütz on Robert Koch through his works was shown by the great triumphs in bacteriology which the latter achieved.

In 1885 and 1886 he was working in the protective and curative inoculation of swine affected with erysipelas and pneumonia; in 1887 on pneumonia and strangles in the horse; and in 1892 and 1894 on tetanus and foot and mouth disease. In 1894 he commenced his researches into glanders, and wrote articles on the "Pathological Anatomy of Glanders," "Mallein Tests," "The Grey Transparent Nodules in Horses' Lungs," "The Study of Glanders."

At the beginning of the nineteenth century Schütz chiefly devoted his attention to tuberculosis, hæmoglobinuria, and glanders.

Schütz and Koch, in 1902, wrote a report on "Tuberculosis of Cattle and Men" for the Ministers of Instruction and Agriculture, and in 1905 the subject of this article contributed a paper at the International Congress at Budapest on "The Relation Between the Tuberculosis of Men and Animals." More recently the agglutination and complimental tests for glanders, along with inoculation of mallein have been generally adopted in Prussia, owing to the researches and initiative of Schütz.

We thus see that for fifty years of his life the man now honoured has been an enthusiastic investigator, dominated by an ardent desire for research. He stands on the same plane as Rudolf Virchow and Robert Koch as a benefactor of his own and other countries. His great knowledge has frequently led to him being consulted and trusted as an adviser on animal plagues in civil and military circles. His fascination as a lecturer can only be appreciated by those who have sat at his feet, his masterly exposition of his subject, and the way that he can make the most difficult, and at times somewhat dry subject interesting, adds to his strength as a teacher.

He has ever been a fighter. All his views have not been calmly accepted. He has never shrunk from publicity. His strong personality and the force of character he possesses, have done much to advance the cause of the science he has at heart.

The Germans (and may we add all scientists of whatever nationality) hope that he may still have many useful years of service.

(*Deutsche Tierärztliche Wochenschrift.*)

Reviews.

THE ENCYCLOPÆDIA OF SPORT,—Complete in about thirty parts; issued fortnightly, illustrated with coloured plates, photographs, and drawings. Price 1s. per part. Published by Mr. William Heinemann, London.

We have received the first two volumes of this work which gives promise of exceeding in excellence anything in the way of an encyclopædia of sport with which we have been brought into contact. It is practically a new work, although it originally appeared twelve years ago. Since then, however, sports have become more numerous and the term more inclusive, and consequently such subjects as "aeronautics" were not dealt with then. The first volume includes both aeronautics and angling. It is right up to date in each case, and is more complete than any work previously published. Moreover, it is written in such a style as to be readily followed by the amateur.

Part II. is quite as interesting and instructive as the first part. Amongst other subjects it deals with archery, athletics, and automobiles, and will constitute a work of reference in each of those sports. The development of the automobile is given chronologically, and is so far up to date as to include a photograph of the motor-sledge built for the Scott Antarctic Expedition of this year. In the athletic section are some wonderful snapshots, which should be seen to be appreciated. The type, photographs, and drawings are all excellent, while the coloured plates are magnificent.

The work will certainly appeal to all lovers of sport, and we recommend our readers to lose no time in becoming possessors of the volumes as they appear.

VETERINARY MEDICINES: Their Actions and Uses. By Finlay Dun. Twelfth edition. Revised and edited by James Macqueen, F.R.C.V.S., and H. A. Woodruff, M.R.C.V.S., Professor in the Royal Veterinary College, London. Demy 8vo., pp. xii. + 822. Price 15s. Published by Mr. David Douglas, Edinburgh.

A standard work that has stood the test of time and has reached the twelfth edition really requires very little to be said of it to emphasize its merits. Science in its various phases has made very rapid strides in recent years, and pharmacology is a striking example of that fact. So much so that many of our ideas as to the actions of drugs have had to be entirely remodelled, and many new drugs have been introduced whose actions have been already definitely ascertained experimentally. It is under these circumstances that we welcome the endeavour of Professors Macqueen and Woodruff to bring this well-known work quite up to date. On looking through it we find that much of the old matter has been deleted, and entirely new matter has been introduced.

The first chapter in its relation to bacteriology has been rewritten in a most excellent and lucid manner, and includes the recent views regarding immunity and the comparatively recently recognized phenomenon of anaphylaxis. A new chapter has been introduced on "Salt Action and the Ionic Theory." We welcome the introduction of

many new drugs, such as the various compounds of bismuth, silver (though argyrol is omitted), and arsenic, adrenalin, yohimbine, trypan-blue, and trypanred, &c. In vain, however, did we look for the well-known hydrastis. Directions as to the use of mallein, tuberculin, and various antitoxins, sera, and vaccines are introduced. The arrangement of the drugs obtained from the vegetable kingdom is rather haphazard, and some definite order would have been preferable. We think it is a pity the dosage of morphia for dogs was not brought more into line with recent knowledge on that point. The old quoted dose of $\frac{1}{10}$ gr. to $\frac{1}{4}$ gr. is repeated, whereas we are daily administering doses of i.gr. and ii.gr. to dogs of the terrier and retriever type, respectively, with excellent results for surgical purposes. In those doses, moreover, the drug is, after apomorphine, the most certain and rapid emetic for dogs we know.

The index of diseases and remedies at the end of the book has also been revised and now consists of nearly seventy pages of small type. It includes a very excellent list of animal parasites and the different varieties of ringworm. We recommend all students and practitioners to buy this edition of the book. They will be amply repaid.

Translations.

PHALANGEAL OSTEITIS COMPLICATED WITH OSTEITIS OF LAMINITIS.

By M. G. MOREL.

Veterinary Surgeon in the 2nd and 3rd Cuirassiers.

According to Professors Sendrail, of Toulouse, and Leblanc, of Lyons, Professor Liénany renders a just homage to the beautiful works of the Sammur School on phalangeal osteitis of inferior localization and frequent fatigue osteitis.

I have recently had a case of pedal osteitis following osteitis of the phalanx primitively diffuse in a mare.

History.—Rigolette II., a mare, aged 6, no record of origin, but externally showed "much blood." She was shown to me on September 18, 1909, for slight off-fore lameness and abscess on the neck. The latter was treated. The foot, slightly hot, showed general sensitiveness of the sole. The officer in charge had noted that Rigolette went feelingly in front. This mincing gait in front was particularly accentuated when the ground was hard.

Diagnosis.—The diagnosis given was phalangeal osteitis. Baths, with subsequent hygienic care, were ordered.

Evolution.—The clinical situation remained the same for five days; the abscess of the nape was cured; there was no increase of lameness, but it did not recede.

On September 24 Rigolette had the characteristic walk of laminitis, with notable heat of the feet. Prognosis grave: there was a complication of osteitis of laminitis, which was grafted on generalized and diffuse osteitis of the third phalanx.

Treatment.—Copious bleeding: pilocarpine, antifebrin, baths. Deformation of the hoofs becomes gradually more prominent; the mare is lean; she is cast. Rigolette was slaughtered on November 24 at Lille, and I obtained her two anterior feet.

Lesions.—After prolonged boiling I withdrew the third phalanges from the horny box and found them covered with stalagmites over the whole extent of their anterior face. The indentations separating the basilar and retrossal processes are transformed into a gap; the external basilar apophyses overhang the anticular surfaces considerably; the retrossal apophyses are prolonged much more than in the normal state behind the preplantear fissure in this mare of 6 years old. The anterior edge was crumbling away. The vascular openings, considerably dilated, have so rarefied the osseous substance that it had very soft consistency. On section the spongeous substance was ecchymosed and bluish. The compact substance of the anterior and inferior surfaces are ecchymosed, and the situation of a rarefying and intense osteitis.

Conclusion.—In conformity with the ideas of our ancient master veterinary, Major Joly (*Les maladies du cheval de troupe*), we find here a good case of laminitis, preceded for a long time by diffuse phalangeal osteitis, and that the lesions of the third phalanx extended not only over all the anterior, superficial, and deep regions of the bone, but over its posterior apophyses, which were for a long time secretly worked by the local habitual manifestations of the osteitis of fatigue.

(*Revue Générale de Médecine Vétérinaire.*)

FRACTURES OF THE OS SUFFRAGINIS IN THE HORSE.

By Veterinary-Surgeon ERICH SILBERSIEPE.

Silbersiepe, after a comprehensive review of literature, has made a study of fractures of the first phalanx with regard to their etiology, pathologic anatomical changes, symptoms, differential diagnosis, course, prognosis, and therapy, and at the same time examined the internal architecture of the first phalanx and its relation to the statics and mechanics of this bone. The most important results of his examinations are as follows:—

(1) The pastern bone of the horse shows, as Eichbaum and Tschokke have already indicated, with regard to its spongiosa, an architecture which is in closest relationship to the statics and mechanics of this bone. For example, where the pressure and pull is the strongest the spongiosa is welded together into compact tissue, and there, where the proximal surface of the joint has most strain put upon it, the bone plates, which stand the pressure, are the strongest. At this place also the spongiosa is the best grown and very close and compact.

(2) Three-fourths of all cases of fractures of the os suffraginis in the horse occur in the fore-limbs.

(3) Fractures are caused by external and internal influences. The latter occur not only from diseased conditions, but from pecularities in the architecture of the bone.

(4) According to their origin one may distinguish (*a*) sagittal fractures; (*b*) segmental fractures; (*c*) horizontal fractures (transverse fractures); (*d*) split and brittle fractures; (*e*) mixed forms.

(5) For a definite healing of fractures of the pastern, the transformation processes are of the greatest significance. They show us that in spite of adverse views on usefulness after recovery, results are favourable, and that the pastern bone regains its full functional activity through the product of the transformation processes.

(*Deutsche Tierärztliche Wochenschrift.*)

THE EMPLOYMENT OF OLEUM TEREBINTHINÆ IN SUBCUTANEOUS INJECTIONS.

By Veterinary-Surgeon I. HOERLYK.

Starup.

The subcutaneous injection of oil of turpentine is well known as a powerful revulsive. It renders good service in the treatment of udder inflammations in the cow, especially in that ailment which is very similar to the yellow gault which Hess and Borgeaud have described. This inflammation of the udder occurred in a dairy of about eighty milch cows. On this standing, in the course of the winter of 1906-1907, twenty-six cows were treated. Four centimetres of oil of turpentine were injected subcutaneously, and in order not to hinder milking, the drug was introduced at the upper wall of the udder. Severe œdema followed. This disappeared after about fourteen days, and left a node as large as a hen's egg, with another one under it as big as a man's fist at the point of injection. These nodes broke up in the course of a further fourteen days. In gangrenous and purulent inflammations of the udder as well as in fresh affections with evil-smelling secretions, turpentine injections do good. Since the beginning of the turpentine treatment 104 cows which suffered from different forms of udder inflammation have been treated. Of these, sixty-nine recovered after three to eight days, and sixteen after eight days to three weeks, and they gave milk again from the affected quarters. Nine cases of septic inflammation and eight cases of abscesses in the udder ended in hardening and atrophy. These subjects were fattened. Two cows with gangrenous inflammation of the udder died.

Further subcutaneous injections of turpentine were employed in inflammation of the lungs in horses, and here 4 c.c. were injected in the breast. A widespread œdema resulted, ending after three to four days in abscess formation. These abscesses generally burst themselves. If this does not happen after four days they should be opened. This favourable abscess formation may be taken advantage also in inflammation of tendon sheaths. The injection aids prognosis. If the horse reacts to it severely a favourable view may be taken as to the recovery of the patient. Twelve horses, two with double-sided pneumonia, have been treated thus in the last two years without a death occurring.

In inflammation of the womb the cows were experimented on

with turpentine injections. Four centimetres were injected in the right side. There was considerable œdema at the site of injection. After two to four days fever declined, and the general condition was better.

The injections were also used advantageously as a prophylactic against tetanus from wounds and picked up nails, and in one case each of hæmorrhage from the lungs and metastatic strangles they had favourable effects. The favourable effect of oil of turpentine is brought about by formation in considerable number of white blood corpuscles, their determination to the point of injection and to the part they play in the healing process. Perhaps also a part of the turpentine is absorbed and causes an increased secretion of the glands and leads to healing.

(*Maanedskrift für Dyrlaeger.*)

Correspondence.

THE "DRY BIBLE" SCARE.

To the Editors of the VETERINARY JOURNAL.

SIRS,—I have the honour to draw your attention to a report appearing in the VETERINARY JOURNAL of March, 1910, on "South Australian Dry Bible," by Veterinary-Surgeon Desmond, in which the following paragraph occurs: "In the *Journal of Agriculture* for August the following figures relating to 'dry bible' are quoted from statistics furnished by the Government Statist. In 1907 there were 47,480 deaths from 'dry bible'; during 1908 there were 11,133 deaths of cattle, both within and outside counties, 'dry bible' being responsible for more than one-fifth of the number—namely, 2,395. The losses to this State are enormous, as the value of the animals can be computed to be between £4 and £5 a head."

The figures quoted in the above paragragh are absolutely incorrect, and, as the VETERINARY JOURNAL has a large circulation both in the British Islands and other parts of the Empire, gross exaggeration and alarmist reports of this kind are apt to brand this State, which is one of the healthiest countries in the world for stock, as a disease-stricken, unhealthy locality, and might prove, unless contradicted, a disastrous advertisement.

The following is a statement prepared by the officers of this Department, giving the number of cattle affected by paralysis (so-called "dry bible") for five years ending June 30, 1909:—

For Year ending	Number of cases	Dairy cattle	Other cattle	Killed	Died	Recovered
June 30, 1905	571	434	137	—	50 %	—
,, 1906	610	—	—	—	70 %	—
,, 1907	585	558	27	3	538	44
,, 1908	289	252	37	—	232	57
,, 1909	356	259	97	—	299	57

I am instructed by my Minister, the Honourable the Commissioner of Crown Lands, to request that you will kindly contradict these inaccuracies as soon as possible.

I have the honour to be, Sir,
Your obedient servant,
R. JOHN NEEDHAM,
Chief Inspector of Stock.

Live Stock and Brands Department,
Adelaide,
May 9, 1910.

A PLEA FOR REFORMED SLAUGHTER-HOUSES.

To the Editors of the VETERINARY JOURNAL

SIRS,—Why do not social reformers of all kinds, whether they are meat-eaters or not, interest themselves in the slaughter-house question? Why do they not bestir themselves to induce the responsible local authorities to take concerted action in regard to the inhuman and insanitary dens of butchery which are a cause of widespread demoralization, physical and moral, in thickly populated districts?

The recent Report of the Admiralty Commission, appointed in 1905 "to consider the humane slaughtering of animals," has the following important recommendation:—

> "That, in the interests not only of humanity, but of sanitation, order, and ultimate economy, it is highly desirable that, where circumstances permit, private slaughter-houses should be replaced by public abattoirs, and that no killing should be permitted except in the latter under official supervision."

The advantage of the public over the private slaughter-house has been repeatedly demonstrated. Yet, owing to the unaccountable apathy of the public, the realization of humanized methods of slaughter is apparently no nearer coming to pass than it was twenty-five years ago, when the late Sir Benjamin Ward Richardson first urged its adoption upon the authorities, and we still remain the only civilized people in Europe, if not in the world, without a comprehensive public abattoir system.

The establishment of properly registered and inspected abattoirs, open always to the observation of humane people, is indeed the only possible way of securing the merciful slaughter of animals.

I remain,
Yours faithfully,
JOSEPH COLLINSON.

THE DEATH OF KING EDWARD VII.

To the Editors of the VETERINARY JOURNAL.

DEAR SIRS,—Will you kindly permit me, knowing no other colleagues in England, to express my share of the profound sorrow at the death of your beloved King?

We Hungarians also knew your late King to be such as you have described him, and he was as well beloved by us as by you.

I feel your great loss, and I trust that your hope concerning to your new King will be fulfilled.

Will you and all my English *confrères* accept my heartfelt condolence?

Yours faithfully,

L. LASZLO,
Veterinary Surgeon.

VI. 16, 10, Füresgyarmat,
Bekes M., Hungary.

Books and Periodicals, &c., Received.

Manual of Tropical Medicine by Castellani and Chalmers (Messrs. Bailliere, Tindall and Cox, London), 21s. net; Proceedings of the Royal Society of Medicine; Bulletin of the Bureau of Sleeping Sickness; Bulletin of Bureau of Animal Industry (U.S.A.); Journal of the Royal Army Medical Corps; The Rhodesian Agricultural Journal; The Agricultural Economist; The British Journal of Tuberculosis; Encyclopædia of Sport. Parts I and II. (Mr. W. Heinemann.)

Letters and Communications, &c.

Mr. L. E. W. Bevan; Mr. Maxwell Edgar; Dr. Sydney Dodd; Lt.-Col. J. Moore; Mr. Laszlo; Mr. Collinson; Inspector Needham; Board of Agriculture and Fisheries; Department of Agriculture and Technical Instruction for Ireland; Secretary of the Royal College of Veterinary Surgeons; Secretary of the Cape of Good Hope V.M.A.

NOTE.—All communications should be addressed to 8, Henrietta Street, Covent Garden, London, W.C. Telephone, 4646 Gerrard. Telegrams, "Baillière, London."

Letters for the JOURNAL, literary contributions, reports, notices, books for review, exchanges, new instruments or materials, and all matter for publication (except advertisements) should be addressed to the Editors.

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Illustrations for reproduction should be in good black or dark brown on white paper or card.

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